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Diffusive Glassware as a Means Toward Proper Lighting

High Brilliancy of Modern Lamp Filaments Requires Modulating Influence of Proper Glassware to Produce Satisfactory Results—Illumination Must Suit the Eye in Order to Be Considered Good

By E. J. DAVIDSON, Jr.

Since Thomas A. Edison introduced his first incandescent filament in 1880 developments in lamps have been made by leaps and bounds. During the early stages of the lamp development its light could be termed a glow rather than a brilliant incandescence. In order to utilize the increased efficiency which has been made possible by the developments of recent years we must devise an auxiliary means by which the highly concentrated brilliant source of light may be so transformed that it is made to imitate to a small degree at least the conditions to which our eyes are accustomed.

In the old lamps one experienced no pain when looking at the bare filament, because its brightness was relatively low—it approximated in appearance the light given from a candle or a kerosene wick. Today, however, pronounced pain is experienced when one's eye is subjected to the intense concentrated rays of the modern electric lamp. In modern illumination three elements are necessary which, when working together as a triumvirate, form a complete unit producing the desired results, and where any of these is lacking our eyes must pay the penalty. The members of the group are the light source, the supporting means, and the light directing and diffusing medium. In every-day language the light source is generally the electric lamp, the supporting means is the metal chandelier, fixture or wall bracket, and the light directing the diffusing medium consists of carefully designed and properly constructed glass bowls, shades, reflectors and inclosing globes.

Church Interior Where Bare Lamps Serve as the Lighting Medium.

View in a Living Room Where the Lights, Because of Their Brightness, Detract From the Beauty of the Room.

We speak of glass as the most logical and practicable diffusing and light directing means for many reasons. By the use of glass of the proper density and good diffusive ability the acutely bright light from the incandescent lamp can be transformed to a modulated light which serves our purposes best by producing adequate, efficient, properly distributed and comfortable illumination. The brilliancy of the source is reduced a hundredfold, the light coming from a very small area represented by the filament of the lamp now emanates from a more extended source of uniform brightness at which one may look without the least pain or discomfort. This diffusing glassware serves to imitate nature—one may look with absolute comfort at a Northern noon sky, and yet we know from this Northern noon sky illumination is produced by day many times greater than that by which we worked at night. By employing glass to diffuse our light and reduce its brilliancy to a practical value we are working toward the Utopian condition of producing light at the least possible cost by the use of highly improved modern gas-filled lamps, the objectionableness of which because of their intense brilliancy has been minimized to the greatest degree.

In our homes it is all important that we should introduce no element which tends to disconcert. In light we have a subtle factor which when properly controlled may create healthy, wholesome and stimulating conditions so that all that enter there may feel its appeal bidding them a greeting to a home rather than to a house. The potentialities of light when properly diffused and softened by glass are greater than one would ordinarily expect. By its use we may paint with light to so change and create moods by the influence of the prevailing subconscious atmosphere that people subjected thereto will be brought under the influence of the power of which they little know, but to which they readily respond. This psychology of light is nothing new, it was evident even to the ancients—no one can deny that a red evening gown has a different effect upon a gathering than a blue one.

In your homes you have carefully selected with perfect taste the colors to be used in the several rooms, but you must also realize that in order to carry out your scheme to completeness the lighting therein must be harmonious. By the use of glass the light in each one of these rooms can be made to correspond and fit in with your plan perfectly. Other forms of shields do not serve as well—they are ephemeral. Glass, on the other hand, is more permanent, its colors are fast, its shape remains the same, and it is easily restored to its original clean and tidy condition.

There is great room for improvement in our interiors by the use of properly made glass. Today, everywhere we go, we see fixtures in which no diffusing glassware is employed. The small round frosted-bulb lamps seem to cry out for help. By some mistaken notion our people have

become inclined to think that the proper way to light small interiors is to buy a handsomely made ornate chandelier upon outstanding arms of which, in candelabra form, bare lamps burn steadily to the discomfort of those who are subjected to their light. They are so bright and glaring that when one enters a room so equipped one is able to perceive none of the furnishings, regardless of the exquisite taste with which they may have been selected, until after the expiration of several minutes time.

An accompanying illustration shows a tastily furnished living room. Upon first glance one sees only the glaring lights. After a while some of the details of the furniture are discernible. But one can never fully appreciate the beauty of the hard wood panels running high up the sidewalls. The human eye is saturated and paralyzed by the light from those bare lamps. Until one becomes accustomed to them other details worthy of one's most careful attention and admiration are of no avail. Contrast this with a room lighted by units so excellently diffused that each little detail, whether of bric-a-brac, tapestry or oil paintings, enters its own individual impression into the composite picture one is endeavoring to present. In such a room the painstaking efforts have shown results—the investment on tastily chosen furniture and trimmings earn more than the interest upon the original expenditure. Their value has been enhanced. Now they become potent factors, capable of contributing a unit impression.

A second illustration shows a handsome church auditorium spoiled by glaring bare lamps—18 on each chandelier. Place yourself in the preacher's position (occupied by the camera) looking down over his congregation whose faces he cannot see. His eye fatigue is certain to tell in his work. This sort of lighting costs more than a proper one in which the brightness of the glass diffusing units is more than just tolerable—in which it is comfortable.

This church has a liberal investment in its organ, but seldom will one admire the pipes in the rear when leaving—they cannot be seen. Our eyes see the brightest object in the field of vision. Consequently all our attention is unconsciously directed toward the lights which are not there to be seen, but to enable other things to be seen. They are the means toward an end and not the end.

By this we see that much good can be counteracted and annulled by improper and careless lighting. Remember that to use your light you must diffuse your light—that the human eye has its limitations, and to these limitations you must appeal.

INDUSTRIAL EXPOSITION PLANNED FOR INDIANAPOLIS.

Electric power plants and the manufacturers of electrical appliances in Indianapolis are planning to take a large part in the Indianapolis Industrial Exposition to be held Oct. 10-15 at the Indiana State Fair Grounds under the auspices of the Indianapolis Chamber of Commerce. Space has already been taken by more than 400 of the 781 different lines of manufacturing in Indianapolis. One of the unique features of the exposition will be that the manufacturers building will be laid out in replica of the retail district of Indianapolis, with the world-famed soldiers and sailors' monument towering in the center of the network of streets named after those in downtown Indianapolis.

The convention of the National Purchasing Agents Association held this same week in Indianapolis, bringing to the city at least half of the corporate buying power of the country is adding an interest to the exposition. "Industrial Indianapolis under one roof will surely stimulate the buying of Indianapolis-made products. Indianapolis leads the world in many lines. It ranks high in the manufacturing of electrical appliances," says C. C. Perry of the Indianapolis Heat & Light Co.

UTILITY RATE POLICY STATED BY COMMISSION CHAIRMAN.

Chairman Frank L. Smith, speaking for the new Illinois Commerce Commission, successor to the Public Utilities Commission, in an open hearing of an important case before that body recently, made the following public statement of policy which he said the commission intends to follow:

"The chair is constrained to make a few observations. We do not want to try any of these cases in the newspapers. There has been reference made to the attitude of this commission on rates—relative to their reduction. We are letting the work of the commission speak for itself. We are going to base our judgment upon the facts. Those who come before the commission may expect to get our honest judgment. They must expect to present their cases with the best ability and all the evidence possible—both sides. We will not render opinions as a matter of party policy. We will not refrain from rendering opinions, however, when in the judgment of this commission they should be rendered for any cause whatsoever. This is the last statement we are going to make about rate making by this commission."

BOARD WILL INVESTIGATE POWER SURCHARGE RATE.

The Board of Public Utility Commissioners of New Jersey has inaugurated a series of hearings to investigate the 25% power surcharge of the Public Service Electric Co. The inquiry has a number of unique features: The investigation will include only 240 customers of the company, or the wholesale power users on the system; in 1919, about 80% of these users urged the Commission to continue the surcharge, including such companies as the Westinghouse Electric & Manufacturing Co. and the Submarine Boat Co., both at Newark. Energy for lighting service has never been subjected to this extra charge.

A contract was recently signed arranging for the installation of an electric-lighting system in the city of Tubarao, Santa Catharina, Brazil. Commercial Attaché W. L. Schurz is informed that the work is in charge of Engineer Tobias Xavier, who is obligated to complete the installation within 1 yr.

Elexit Devices Ready for Dealers Before New Year

Design and Development of New Removable Lighting "Fixture" Told at the Electrical Contractor-Dealer Conference in National Congress of Retail Merchants—Product Has Been Standardized

By BEN TOUSLEY
Electric Outlet Co., New York City.

Every now and then, in the course of human events, there is developed a brilliant thought that does much to promote the happiness and comfort of our race.

Years ago, Franklin touched his knuckles to a key attached to the tail of a kite, and from that grew the discovery and development of the greatest force controlled by mankind.

Since the time of Franklin, other great minds have been devoted to the task of making this

Installing Wall Brackets Having Flexible Terminal Connections.

force subservient to the commands, not alone of scientists, but to the layman whose knowledge of electricity is largely confined to the effects produced by the pressure of a switch.

Elexits for Removable Fixtures Evolved to Meet Modern Demand.

And now there is before the electrical industry, another such development. I refer to *Elexits*—"Places of Lights." Nearly everyone in the industry has heard of elexits, either through having read announcements in the various trade publications or through trade gossip. In the few months that have elapsed since the initial advertisement of elexits was published by the Electric Outlet Co., New York City, it is generally admitted that there has been stirred up among the affected trade groups a greater degree of interest in this new electric outlet and fixture-supporting service than by any single electrical idea in recent years.

The very thought of plugging-in lighting fixtures, opening as it does tremendous advantages to the householder to procure unusual lighting effects, and to possess personally the beautiful products now being offered by the lighting fixture manufacturers, has appealed to the imagination of not only the novelty-loving public, but even to the most blasé members of the electrical industry who are acquainted with the possibilities of elexits.

A year ago, there was only a casual interest in the efforts to bring out a device which would enable a layman to attach a fixture with the ease of plugging-in a portable lamp in a base outlet. It was in January, 1920, that the idea of hanging a fixture like a picture was first launched in the electrical press. At that time there were published many cartoons portraying the plugging-in of fixtures as compared with the present primitive method of soldered and taped joints. Somewhat previous to this, however, E. Cantelo White, an engineer plus a practical fixture man, now president of the Electric Outlet Co., had begun to give this matter his serious attention. Many ways of solving the problem occurred to him, but were discarded in favor of the elexit device.

The Electric Outlet Co. first developed in these elexits the means of standardising electric lighting outlets, the greatest need of the lighting industry. Elexits, together with plugs for elexits, made lighting fixtures movable, changeable or detachable by simply plugging-in and plugging-out. Through publicity, the Electric Outlet Co. told the advantages of elexits to the public, to the architect and to all branches of the trade.

Response was instant. Orders were received from all over the country. Inquiries came from Australia, China, Japan and the European countries. Architects specified elexits, and the public demand became apparent. Elexit devices were being manufactured in commercial quantities.

Meanwhile, other manufacturers had begun to work on devices for accomplishing a similar purpose in ways not interchangeable with elexit devices. Had this continued and a multiplicity of devices been brought out, the general adoption of this important development would have been

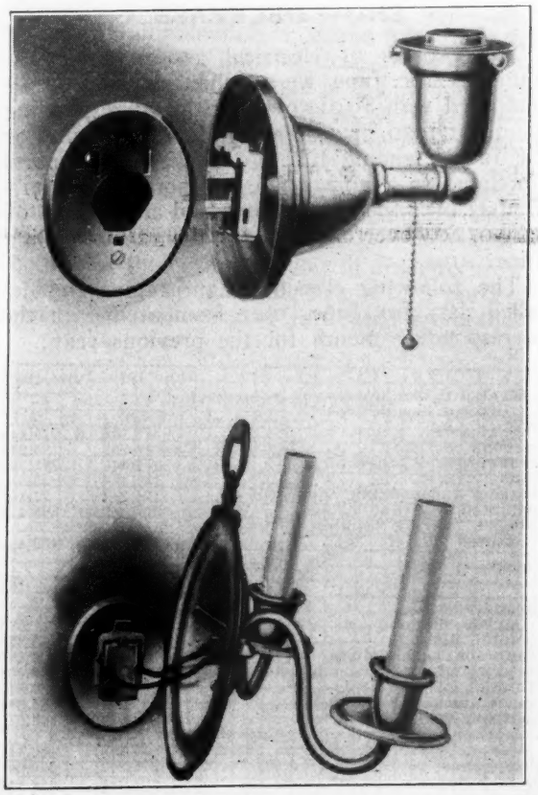
seriously retarded and the minds of the public and trade confused. We all know the endless confusion that has resulted from the 37 different kinds of plugs and receptacles now in the market.

Manufacturers Agree Upon Details for Standardization of Elexits.

In an effort to avoid such an unfortunate condition, these manufacturers met with the Electric Outlet Co. to work out the details of standardising on a single device that would be as nearly perfect as the combined engineering forces of these companies could make it.

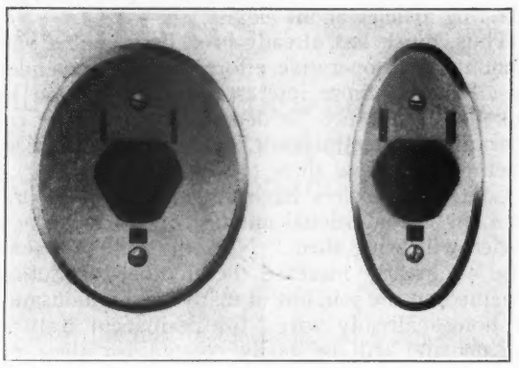
The opinions of such groups as the National Association of Electrical Contractors and Dealers and the National Council of Lighting Fixture Manufacturers were consulted that all of the conditions that must be met might be thoroughly understood. Likewise, individual fixture manufacturers, electrical contractors and the other representatives of groups whose interests are to be affected by this device were consulted. Their co-operation and suggestions have been invaluable.

The spirit of the various manufacturers has been truly wonderful, each representative doing his utmost in the interest of harmony. The meetings have been epochal for, gathered together for perhaps the first time, were representatives of all the large and well-known companies that manufacture a large proportion of the wiring supplies used in this country, and who, when the interest of the public in this device was called to their attention, put aside ungrudgingly their own personal interests and kept everlastingly before them the inspiration of "The Public's Demand."



Views Showing Rigid and Flexible Types of Wall Bracket Connections.

I am now privileged to make the important announcement that in the interests of standardization, and to prevent the endless complication and inconvenience that would result if non-interchangeable devices were manufactured, the Electric Outlet Co. has entered into an interlicensing plan with the country's leading manufacturers of wiring devices, under which they manufacture and sell elexit devices that have been standardized in every respect necessary for interchangeable use. As a result of this final step, which was reached only Aug. 4, elexit devices will be manufactured and sold by the following companies:



Types of Standard Plates for Attachment of Wall Brackets.

Arrow Electric Co.	Hartford, Conn.
Benjamin Electric Manufacturing Co.	Chicago.
Bryant Electric Co.	Bridgeport, Conn.
Cutler-Hammer Manufacturing Co.	Milwaukee.
Economy Fuse & Manufacturing Co.	Chicago.
General Electric Co.	Bridgeport, Conn.
Hart & Hegeman Manufacturing Co.	Hartford, Conn.
Harvey Hubbell, Inc.	Bridgeport, Conn.
H. T. Paiste Co.	Philadelphia.
Pass & Seymour	Solvay, N. Y.
Weber Electric Co.	Schenectady, N. Y

In manufacturing elexits absolute standardization will be provided for, and all elexit parts will be interchangeable between receptacles and plugs regardless of the origin of their manufacture. Thus can a fixture made in Philadelphia be installed by a layman in St. Louis in an elexit, the parts of which may have been made in Chicago, Schenectady and Bridgeport. Under these conditions, the benefits to be derived will be maximum.

Advertising and Reading Matter to Be Used in Popularizing Device.

The Electric Outlet Co. will continue to bring to the attention of the public the advantages of having elexits in their homes and other buildings. This will be accomplished through direct and indirect advertising and through personal exploitation. There is scarcely any group in the electrical industry whose interests are not touched by elexits, and an effort will be made to acquaint these groups with the maximum advantages elexits hold for them. These devices will be ready for the trade before the first of the year.

To date, the elexit story has been told by means of preliminary advertisements to at least one reader no less than 1,538,000 times. We have

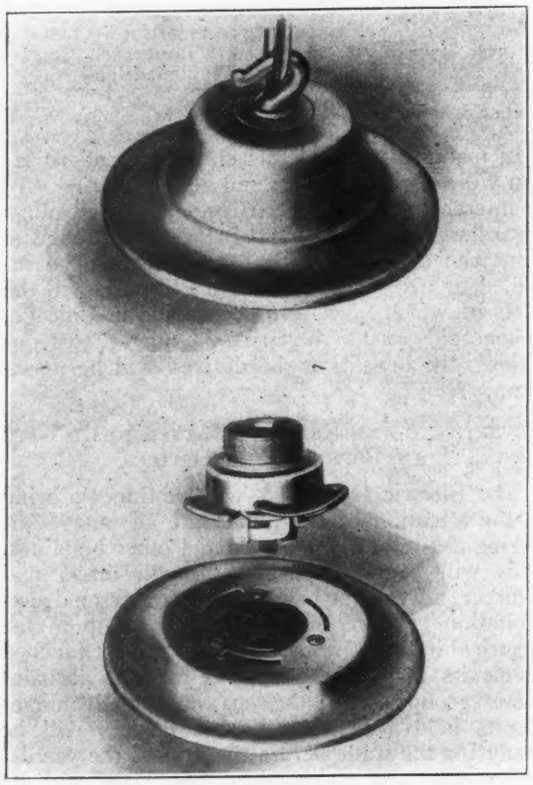
used space in all of the prominent electrical, architectural and engineering trade papers, as well as some of the general magazines, while newspapers all over the country, circulating to approximately 7,000,000 people, have published interesting articles about elexits.

Thus, much has already been done, but a vast amount of co-operative effort must be expended by all of us whose interests will be effected by this device. Much is dependent upon the co-operation and enthusiasm which men of the contractor-dealer field show towards elexits.

Contractor-dealers have already begun to prepare for the additional amount of work the new device will bring them. Not only will the elexit tend to greatly increase the number of outlets specified on the job, but in many of the thousands of homes already wired for permanent fixtures the demand will be easily created for their replacement with elexit receptacles. This alone will give an immense amount of work for the smaller contractors at a handsome profit. Any device that will thus create new business is of incalculable benefit to the entire industry.

From the point of view of the dealer, elexits are going to take the side-wall and ceiling units out of the fixture class and make them portable. By reason of the element of portability, they will become elexiliers—lighting fixtures properly equipped with elexit plugs—and as such will be better merchandise than they can ever become under the present method of hanging. The contractor who cannot see the advantages of elexits is undoubtedly the same one of narrow vision who is constantly cutting out outlets in order to underbid a competitor, and is the greatest handicap that the industry has at the present time.

A detachable device for plugging-in fixtures is urgently needed; this is the best that can be designed and it will be universally adopted. Let us all get together and make the dawn of this new era in lighting as bright in its realization as in its present golden promise.



Elexit Ceiling Outlet, Plug and Canopy for Suspended Elexilier.

Installing Wall Brackets Having Terminals Connected Rigidly.

JUNE ELECTRICAL GOODS EXPORTS SHOW DECREASE.

The exports of electrical goods to foreign countries for June were valued at $7,315,794, compared with $9,012,013 for the corresponding month of 1920, or a decrease of $1,696,219. For the 12 mo. ending June, 1921, the total exports amounted to $119,221,928, an increase of $31,974,943 over the 1920 figures and an increase of $38,507,804 over the total for the 12 mo. ending June, 1919.

The following classified figures give the detailed data for June, 1921, compared with the corresponding month for the previous year:

	June, 1920.	June, 1921.
Electrical machinery and appliances (except locomotives):		
Batteries	$ 578,146	$ 246,844
Carbons	113,109	24,211
Dynamos and generators	571,340	581,992
Fans	191,434	45,540
Heating and cooking apparatus	164,344	77,866
Insulated wire and cables	593,370	588,211
Interior wiring supplies, including fixtures	270,709	105,436
Lamps—		
Arc	7,743	167
Incandescent—		
Carbon filament	4,518	11,985
Metal filament	364,864	246,450
Magnetos, spark plugs, etc.	290,723	106,890
Meters and measuring instruments	237,735	269,504
Motors	1,250,638	1,437,812
Rheostats and controllers	83,504	85,568
Switches and accessories	608,394	263,516
Telegraph apparatus, including wireless	30,458	13,417
Telephones	275,212	299,066
Transformers	402,016	541,644
All other	2,973,756	2,366,675
Total electrical machinery, etc.	$9,012,013	$7,315,794

Charts and Data for Industral Lighting Designs

Standardized Reflecting Units, Combined With High-Effiency Lamps, Provide Good Illumination for Great Variety of Services —Height of Suspension Related to Spacing, Reflector and Lamp

By P. A. POWERS

Benjamin Electric Manufacturing Co., Chicago.

The first consideration in planning a successful lighting installation is, of course, to select the proper types of reflectors for the job, but the efficiency of the lighting system depends greatly on certain other factors. For the purpose of this article let us proceed to define these factors before going into the matter of reflector equipment. These factors are: Mounting height; spacing distance, and intensity. In planning any system of illumination after the type or types of reflector have been determined, according to the requirements of various factory operations, as explained later, the next steps concern the mounting height, the spacing of units and size of lamps.

Simple rules and charts which follow briefly describe the methods used in solving these angles of the problem. These rules and charts are necessarily brief, but are sufficient for the solution of ordinary illumination problems. They are easy to use, and in practice will give results which are approximately accurate.

Mounting height.—In most factory buildings where general illumination is desired it is the best practice to mount the units as close to the ceiling as possible. The ceiling height in the general run of factory buildings is from 12 to 20 ft., so that the mounting height of the reflector is in most cases determined by the height of the ceiling.

Where there are belts and pulleys, or protruding beams, it is necessary to mount the unit so that the bottom of the reflector is in line with the bottom of the beam or pulley in order to prevent shadows. The mounting height of a porcelain enameled-steel reflector is figured from the bottom of the unit to the floor. If a reflector of the socket type were mounted as close to the ceiling as possible the drop of the unit would be about 1 ft. from the ceiling.

Wider spacing is possible when units are mounted high, but consideration of shadows, appearance and arrangement of work may make a lesser mounting height advisable even though it makes necessary a closer spacing of outlets in order to maintain uniform illumination. In cases where the outlets are already in place the mounting height is limited by a certain ratio to the spacing distance. This limit can be found by reference to the accompanying chart *C*.

Spacing of units.—Proper spacing of units will depend upon the location of posts, the arrangement of machines, benches, etc., the nature and arrangement of work, and the type of reflector to be used. A number of smaller light sources is preferable to a few large ones. This insures better distribution and eliminates sharp shadows. If the construction of the building divides the ceiling into bays the units should be symmetrically arranged in the bays in such a manner as to provide uniform illumination of the required intensity. An accompanying diagram illustrates one method used to accomplish this, the dotted lines representing the natural division of the building or room into bays.

In case the overhead construction of the building does not lend itself easily to this layout it is possible to divide the area to correspond to the overhead construction. If this is done it must be borne in mind that the spacing distance for a

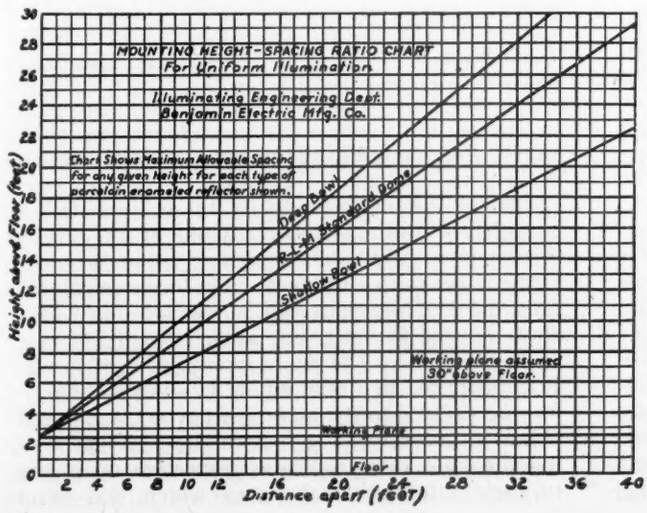

MOUNTING HEIGHT-SPACING RATIO CHART
For Uniform Illumination
Illuminating Engineering Dept.
Benjamin Electric Mfg. Co.
Chart Shows Maximum Allowable Spacing For any given Height for each type of porcelain enameled reflector shown.
Deep Bowl
Rlwy Standard Dome
Shallow Bowl
Working plane assumed 30" above Floor.
Working Plane
Floor
Height above Floor (Feet)
Distance apart (FEET)

Chart D.—Diagram Showing Mounting Height and Spacing Ratio for Uniform Illumination.

given mounting height should not be greater than the ratio given in chart *D*, and that a large number of small units is preferable to a small number of large units, from the standpoint of utility.

Chart Employed to Determine Height and Spacing of Units.

Each of the diagonal lines drawn across chart *D* represents one of three chief types of porcelain enameled-steel reflectors. The distance between reflectors properly installed is in constant proportion to the mounting height. This ratio is the same for all sizes of reflectors of any one type, but the ratio of each type is different from that of the others. One use of chart *D* is to show the proper mounting height for reflectors when the outlets are already in place and the spacing is therefore known. For instance, if the distance between outlets is 16 ft., and the R.L.M. standard

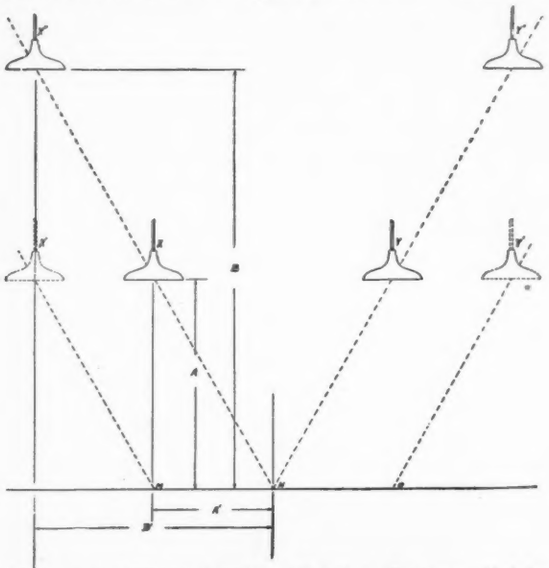


Chart B.—Diagram Showing Relation Between Height and Spacing for Uniform Illumination.

dome reflector is to be used, first find the intersection of the vertical line extending from 16 ft. on the scale at the bottom of the chart and the diagonal line representing the R.L.M. standard dome. The horizontal line which crosses at the intersection runs to 13.25 on the scale at the left, which is, therefore, the proper mounting height in feet.

Where the installation is to be entirely new the chart can be used to find the proper spacing based on a desired mounting height. The correct spacing is obtained by locating the intersection of the horizontal line indicating the mounting height and the diagonal line representing the reflector specified. On the scale at the bottom is indicated the spacing necessary between reflectors.

Chart *B* shows the proper relation between spacing distance and mounting height that must be observed to obtain uniform illumination. Suppose two reflectors, *X* and *Y*, are *2A'* ft. apart, and *A* ft. high. Their distributions will then secure uniform illumination. If the reflectors are moved further apart to positions *X'Y'* the points of maximum distribution occur at *M* and *O*, causing a dark spot between and nonuniform illumination. But if these reflectors are raised vertically to *X"* and *Y"*, i. e., have a mounting

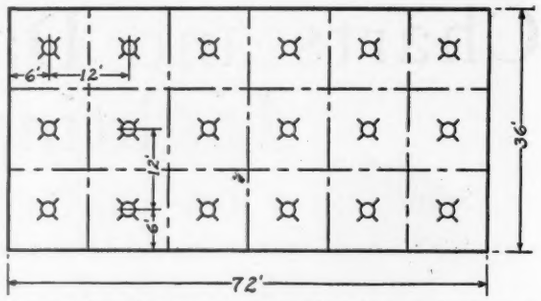
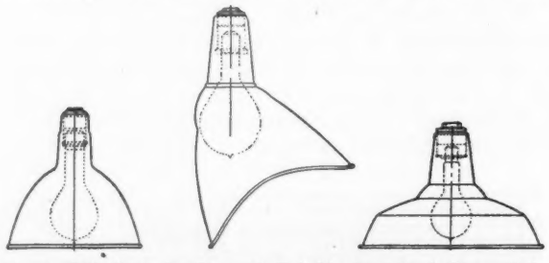


Diagram Showing Arrangement of Outlets to Conform to Building Details.

height *B* to correspond with this spacing, the result will be uniform illumination. Larger lamps must necessarily be used to obtain the same intensity as when reflectors are located at *X* and *Y*.

Intensity.—The proper intensity of illumination for each installation should be carefully considered. The unit of intensity is the foot-candle. For the purpose of the moment a table is presented which is intended as a guide rather than as a rule. It will give the reader the present-day intensity recommendations of illuminating engineers for a large number of important industries. Where low and high intensities are recommended for one industry it should be understood that the low intensity is for places where the rough or heavier work is done, and the high intensity for the departments where the finer operations are performed.

To illustrate the use of the table of intensities in finding the proper size of lamp to use we will suppose that the room being considered is the buffing and grinding room of a machine shop. By referring to the table of intensities it is found that this class of work requires an intensity of 8 foot-candles. In the room layout on the previous page the area of each division to be lighted by a unit is 144 sq. ft. Next, referring to chart *C*, we locate the intersection of a line opposite 144 sq. ft. and the line above the figure 8 (foot-candles). This intersection is seen to be near the



Bowl, Elliptical Angle, and R.L.M. Standard Enameled-Steel Reflectors.

curved line representing the 150-watt lamp, which is the size to adopt in this case.

Should the intersection of these lines fall a considerable distance above any one of the curved lines it is usually the best plan to adopt the next larger size lamp, unless a more economical arrangement of the units can be worked out. This chart is used to determine area, intensity or size of lamp when two of these quantities are known. For instance, in designing a lighting system it may be decided to use a 200-watt type C lamp and obtain an intensity of 3 foot-candles. By following the lines carrying these respective quantities to their intersection the area which this lamp

will cover at this intensity is shown as 500 sq. ft. If it is desired to light 400 sq. ft. with 200-watt lamps and it is desired to know what intensity will result, the answer shown by the chart is 3.75 foot-candles.

Suppose we wish to obtain 11 foot-candles of illumination over an area of 400 sq. ft. What size of lamp shall be used? Looking at the chart

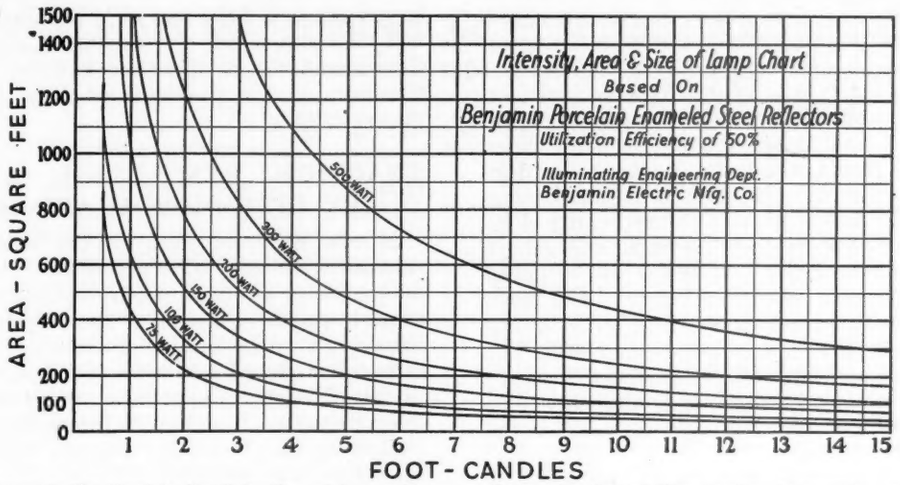


Chart C.—Curves to Be Used in the Selection of Lamp Sizes, or Determination of Illumination Intensities, or Areas That Can Be Lighted.

we find that the perpendicular line at 11 foot-candles intersects the horizontal line opposite 400 sq. ft. at the curve of the 500-watt lamp.

Particular Advantages of Porcelain Enameled-Steel Reflectors.

That porcelain enameled-steel reflectors are today generally accepted as the most practical for indoor and outdoor industrial lighting requirements cannot be denied in the face of the great numbers to be found in use in every kind of industry. Probably it is not common knowledge that, originally, the idea of using porcelain enamel for reflecting units was not at all acceptable. In fact, it was more or less ridiculed. Therefore, it must be borne in mind that the present favorable attitude toward this material is based upon 10 to 15 yrs. of experience with it and an equal time employed in extensive tests. The tendency has been at all times to improve the product.

Industrial engineers, electrical engineers and experts on illumination, as well as the workmen themselves, today agree that steel reflectors, which have fused upon them a proper coating of porcelain enamel, produce results in the form of improved illumination second only in importance to the remarkable progress made in the manufacture of electric lamps. Porcelain enamel possesses reflecting qualities of a high order, but at the same time it combines in a very marked fashion the quality of diffusing light in such a manner as greatly to reduce glare and consequent eye injury where glare is present.

Modern methods of manufacture have in most types eliminated seams and exposed edges from the reflector designs, so that the enamel with its flint-like surface is all that is exposed to deteriorating gases or moisture. In the plant of at least one leading reflector manufacturer the process of enameling is under the watchful eyes of specializing chemists, and no trouble is spared in bringing together the very best elements needed to produce a fine enamel. Throughout the steps of mixing, smelting, grinding, applying and fusing the slightest imperfection disqualifies the material. The least deviation from established standards results in the elimination of individual pieces or of the entire batch if necessary.

In reflector design one of the greatest achievements has been the agreement on the part of both reflector and lamp manufacturers in a common standard for general factory lighting purposes.

TABLE SHOWING RECOMMENDED INTENSITY OF ILLUMINATION FOR VARIOUS INDUSTRIES.

Industry.	Foot-Candles.
Warehouses and wharves	3
Bath (public) and depots	3 to 4
Bowling alleys	3 to 5
Automobile garage, armory, locker, toilet and wash rooms, packing and shipping, stock rooms	4
Soap manufacturing	5 to 6
Box making, wood working (rough), gymnasiums, meat packing	5 to 8
Paper manufacturing, paint shops	5 to 10
Clothing, cloaks, suits, etc.:	
Inspection, machine sewing	15
Cutting, pressing	10
Candy making, canning and preserving	8
Foundries	6 to 10
Cotton mills:	
Inspecting	12
Spooling, cording, weaving, etc.	8
Dyeing	4
Bakeries, electric plating and electrotyping, laundries and dry cleaning, paper box manufacturing, forge shops (welding and drop forgings)	8
Book making	6 to 10
Drafting rooms, engraving	10
Leather manufacturing and working:	
Finishing, scarfing	10
Other operations	6 to 8
Silk mills, glove manufacturing	6 to 12
Sheet metal working:	
Fine bench work	12
Ordinary bench work	6
Woolen mills	6 to 15
Machine shops:	
Die making, fine bench work	15
Fine lathe work, inspecting	10
Buffers, drills, grinders, shapers, planers, ordinary lathe work	8
Saws	6
Fine wood working	10
Shoe manufacturing:	
Hand turning, ordinary machine work	8
Other operations	10
Pattern shops, billboards, courts (tennis, handball. etc.)	8
Printing:	
Linotype	15
Composing stone, typesetting	10
Other operations	8

The reflector design resulting from these efforts was one which produced a certain effect in the distribution of light which was accepted by illu-

minating engineers as being desirable for general lighting purposes. All reflectors which conform to this standard are labeled as R.L.M., the reflector and lamp manufacturers' standard. This label is issued to the manufacturers of approved reflectors by the central organization known as the Electrical Testing Laboratories of New York. The R.L.M. reflector, as previously stated, is for general lighting; that is, for the illumination of a room considered as a whole, as distinguished from localized lighting wherein each machine or bench has its own lighting unit.

It is to be expected that one type of reflector could not meet the requirements for general lighting under all conditions. There are many cases in industrial plants where the illuminating effect produced by the R.L.M. reflector is not the one most suitable. Cases where an almost entire elimination of shadows is not essential and where illumination of vertical surfaces is not required are satisfied by the "Bowl" reflector. The Bowl reflector also serves well where it is found necessary to light an individual machine or bench. The "Fluted Bowl" reflector is recommended for very high mounting conditions. It is the only type that will give the intensive light distribution required for such cases.

In mills where traveling cranes are used or moving machinery occupies the center of the space it is frequently impossible to hang lighting units other than at the sides of the space. Here the "Elliptical Angle" reflector properly installed will furnish the desirable results.

It is possible here to touch upon, in a general way only, the purposes of reflector types. There are sometimes unusual conditions to be met, and frequently the architectural design of a building will play an important part in the determination of the proper type to be used. Therefore, it is earnestly recommended that any industrial plant manager in considering the improvement of his illumination, indoors or outdoors, consult an illuminating specialist such as an architect, electrical engineer, or perhaps his electrical contractor, in order that he may become acquainted with the proper and most modern methods. The foot-candle meter is more accurate than the eye, and the specialist will employ it to advantage in his tests upon existing installations. The specialist who has studied these problems is able to furnish information, not only upon the correct units to use in any specific location, but is able to furnish the industrial plant manager with data which will indicate just what effect proper illumination will have upon his costs of production, his wastage and spoilage, and in the reduction of accidents to the human beings whom he employs.

ELECTRICAL EXPOSITION WILL BE HELD IN MILWAUKEE.

The Milwaukee Chapter of the Wisconsin State Association of Electrical Contractors and Dealers has reserved two-thirds of exposition hall of the Auditorium for its annual electrical show to be held in connection with the third annual Food and Household exposition, Oct. 25-31, under direction of *The Milwaukee Journal* co-operating with the Milwaukee Retail Grocers' Association. At a recent meeting of the directors of the Association it was decided that electrical dealers and contractors would rather become a part of the third annual Food and Household exposition than to hold a show of their own, as they have done the last few years.

Two-thirds of the exposition will be devoted to displays of electrical household conveniences and appliances, and factory and home equipment, including electric wires, cables, lights and fixtures. A large industrial electric plant, almost large enough to light one of Milwaukee's suburbs, will be installed for the benefit of electric plant superintendents of the state and for public instruction on the problems of light and power manufacturing.

TRACTION RESOLUTION ADOPTED BY PITTSBURGH "AD" CLUB.

Morris Knowles, head of the Knowles-Main Appraisal Bureau of Pittsburgh, spoke before the members of the Pittsburgh Advertising Club recently on the subject of the pro-settlement of Pittsburgh transportation problems. The speaker was introduced by Barton Stevenson, manager of the Railway Department, Pittsburgh office, Westinghouse Electric & Manufacturing Co. Following Mr. Knowles' address the following resolution was adopted:

"Whereas, the street railway transportation, which is vital to the prosperity and progress of Pittsburgh, has been inadequate for many years and has had a very serious effect upon the growth of the district, therefore, be it

"Resolved, by the members of the Pittsburgh Advertising Club that every possible effort be made to effect a speedy reorganization of the Pittsburgh Railway Co. that better service may again be given Pittsburgh and that the municipal authorities lose no time in perfecting an agreement of co-operation with the company that proper financing may be made possible."

NATIONAL COUNCIL DESIGNS NEW TRADE LABEL.

The new labels designed by the National Council of Lighting Fixture Manufacturers are being distributed. They are printed in three colors—black, green and orange—and are considered a lot better looking than the old ones. The serial number is printed in the open space at the bottom of the label. The new labels, which are a trifle smaller than the old ones, make a striking combination.

The National Council of Lighting Fixture Manufacturers calls attention to the advantage of using these labels. Attached to the products manufactured by the members, the label gives them prestige and inspires confidence in their merit.

UTILITY OPERATIONS LIMITED.

The Pennsylvania Public Service Commission in approving a number of applications for charters for electric companies in the state, stipulates that such utilities "shall not extend service under the adjacent territory provision in their charters outside of the territorial limits of the said townships, unless and until such extension in furnishing of such service shall be approved by the Commission."

High-Intensity Illumination of Office Buildings

Equipment Employed and Results Obtained in Lighting New Offices of the Detroit Edison Co. — Uniformity and Absence of Glare Vital Factors — Interior Finish Improves Conditions

By IVAN M. KIRLIN

The central station company in any community is looked upon by the general public to set the standard of illumination. The methods, therefore, that are employed by the central station in the lighting of its own buildings have an important effect upon the use of artificial lighting by its customers. The officials of the Detroit Edison Co. had this point in mind in selecting the system that is now in use in their new office building. There were many other points, however, that were given careful consideration in selecting the equipment. It was desired that the system finally adopted should be characterized by an absence of glare that might cause eye strain, that the system should give a uniform illumination in all parts of the office space, that the fixtures when installed should present a cheerful and pleasing effect, and that the fixtures should be of a type that would give adequate illumination and could be readily maintained.

It will be noted in the description that follows that the intensity of illumination employed throughout the entire building is of a higher value than is to be found ordinarily. In this respect the Detroit Edison Co. is carrying out one of the tendencies in the development of the lighting art. The trend is toward the use of higher intensities in the use of artificial illumination. Where 2 or 3 foot-candles was considered sufficient a few years ago for office lighting we now think of 6, 7, 8 or 10 foot-candles as being the desirable intensity. Higher intensities in lighting give greater production in the industries, aid the merchant in making quicker sales of merchandise, stimulate the efforts of office employes and are beneficial in many other ways.

From tests that have recently been made the next logical step in illumination practice seems to be the building up of intensities for practically every requirement. When we consider that in

President's Office Where Four Fixtures Are Used to Produce an Average Intensity of 11.3 Foot-Candles.

the daylight we use from 50 to 100 foot-candles, it becomes apparent that artificial lighting intensities are comparatively low. It is not in the least fanciful, then, to expect our artificial lighting in a few years to be on what we now consider a

General Office Space Lighted to Intensity of 10.2 Foot-Candles.

very high plane of intensity. In the use of high intensities it will, of course, be necessary to diffuse the light and protect the eye from the harmful glare of the light source.

Before making a final selection of the lighting system that was eventually installed by the Detroit Edison Co., an exhaustive test and investigation was made of 12 types of fixtures. Representative installations of direct, semi-indirect and indirect lighting were made. The units were installed in typical areas where the room dimensions, decorations and furnishings were similar to those in the new building that was then under construction. With the various types of units thus installed an opportunity was afforded to study the cost of operation, cost of maintenance, depreciation, intensity of light delivered, the glare effects and the seeing efficiency for each type.

In the preliminary tests which were conducted to determine on the type of lighting equipment eight fixtures were installed of each kind wherever possible. Photometric readings were made at a sufficient number of points to insure that accurate values were obtained for the average intensity delivered by each system. Special care was taken to avoid the erroneous practice frequently met with taking readings at a few points from directly beneath one outlet to the next outlet and obtaining an average intensity by dividing the sum of these readings by the number of readings taken. A test of this nature does not give the true average intensity of light.

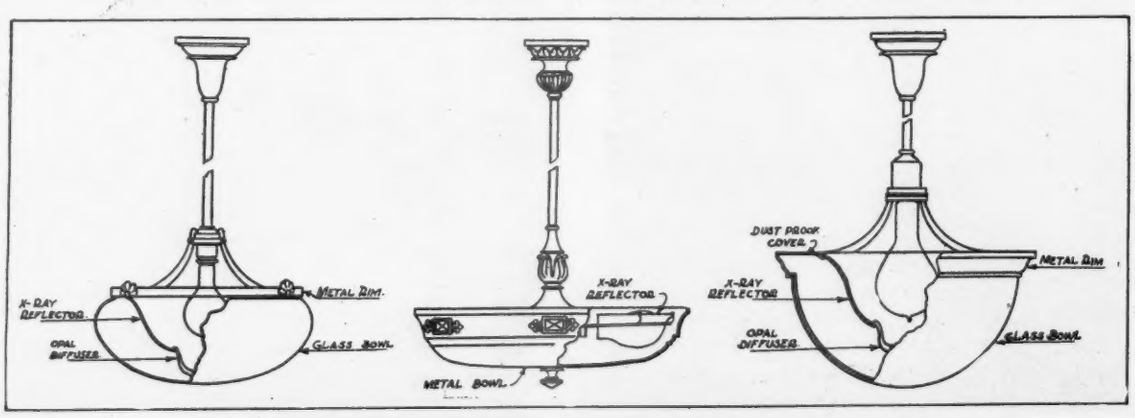
The intensity of glare from the various types of units as reflected from desk tops, polished parts of adding machines, etc., was carefully noted, as well as the intensity of shadows cast by furniture and by employes at their desks. This particular investigation indicated the desirability of having for office work a most widely diffused light source—greater than could be obtained with direct lighting units.

Average Illumination of 10 Foot-Candles Selected as Desirable.

For the 12 types of units tested there was not a great difference in the average intensity of light delivered. A value of 10 foot-candles had been previously determined upon as the minimum average intensity desired. It was found that this average intensity was exceeded by several of the units, especially when 200-watt lamps were used at each outlet. Some of the better styles of "filtered" direct lighting units gave about 15% higher average readings than the semi-indirect and totally indirect luminous-bowl units, while some of the dense direct lighting units gave a lower average intensity than the indirect. As a result of the tests thus made 200-watt lamps were selected for the general illumination and 300-watt lamps for each outlet in the drafting room.

It was found that the uniformity of diffusion of light was a far greater variable than the average intensity obtained from the various types of units. This factor ranged from 20% variation for the totally indirect system to 100% for some of the direct lighting types. It was considered important in this installation that the maximum uniformity of illumination be obtained, inasmuch as the outlets were located irrespective of the location of partitions, office furniture, etc.

In order to determine the cost of maintenance a careful check was made of the time required to clean the various types of lighting units. One of the maintenance operations was to note the number of parts that were necessary to remove in order to properly clean the glassware of the fixture and relamp. A note was also made of the liability of breakage in the maintenance operation. The three principal factors which cause depreciation and result in a loss of illumination intensity are worth repeating. They are dust col-



Diagrams Showing Three Different Types of Indirect Lighting Fixtures.

lection on the lamp and reflector, the soiling of ceilings and walls, and the aging of lamps.

The relationship between time between cleaning periods in weeks and the percentage of the original efficiency of the lighting system has often been shown. Tests indicate that a decrease in lighting efficiency of approximately 10% a month results from accumulation of dirt and dust upon the lighting equipment. If lamps and fixtures are cleaned regularly every two months we may expect the average illumination throughout the year to be at least 80% of that received when all of the equipment is clean.

Provision Made for Regular Cleaning and Maintenance of Equipment.

In this particular installation the Detroit Edison Co., to insure proper maintenance, employs a competent man under the direction of the chief janitor to carry on the work of cleaning and relamping the lighting fixtures. This man devotes his entire time to maintenance, and since there are about 2500 fixtures in the installation each lighting unit is thoroughly cleaned every 4 wks. The maintenance of lighting fixtures may be simplified by the adoption of a finish which is washable. In this particular instance the metal parts of the units have been finished in a washable bronze.

After tabulation of all the information regarding intensities, uniformity of distribution, cost of maintenance, etc., the authorities in charge of the selection of lighting equipment set about to decide upon the type of equipment to be used in the new building. The building committee adopted the totally indirect system, using fixtures of the type shown in the accompanying illustrations. For corridors, toilets, etc., direct lighting units were selected. In the main entrance lobby three ornamental-iron ceiling fixtures were installed. These fixtures were equipped with bare lamps tinted to a warm yellow color.

The diagrams show the three principal types of

View Showing Typical Illumination of Corridor Space.

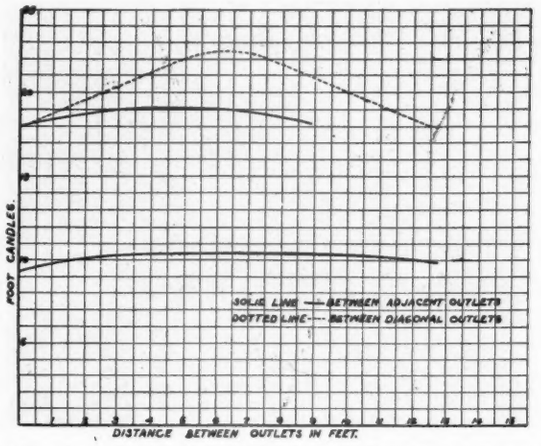

FOOT CANDLES.
SOLID LINE —— BETWEEN ADJACENT OUTLETS
DOTTED LINE ---- BETWEEN DIAGONAL OUTLETS
DISTANCE BETWEEN OUTLETS IN FEET.

Diagram Showing Variation in Illumination Between Outlets.

indirect fixtures adopted. One of the styles is a solid-metal opaque fixture of shallow design, containing silvered reflector equipment with lamps burning in a horizontal position. The application of this fixture can be seen in the illustration of the president's office. What is known as the "luminous bowl" indirect lighting fixture is used throughout the office and drafting room space. The illustration of the general office space gives a clear idea of the appearance of the indirect fixture with a plain glass bowl. This bowl contains a silvered reflector designed for indirect lighting and having a diffusing cup which illuminates the inclosing bowl to the proper brightness. It will be noted that the diameter of the reflector is just the same as the diameter of the bowl opening. Because of the fact that the two pieces of glassware fit together at this point the accumulation of dust inside of the fixture bowl is prevented to a large extent.

Another style of fixture of the "luminous bowl" type is used in the drafting room and private offices. This fixture has a special feature which simplifies its maintenance. A dust ring or cover is provided, which fills up the space intervening between the reflector and the outer edge of the bowl. This dust ring prevents dirt from settling into the glass container of the reflector equipment, and at the same time affords a means of support for the silvered reflector. A fixture of this type is cleaned with little effort, since there are no parts to be removed in the usual maintenance operation.

Interior Finish a Factor in Continued Good Illumination.

Another point of interest is the care with which the finishes were selected for the ceilings and walls. Seven of the most suitable paints for this purpose were applied to wall surfaces and subjected to severe tests, such as fire, washing compounds, etc. Even the advisability of washing the painted surfaces with milk or buttermilk was considered. Paints that were tested varied greatly as to their permanency. The one that was finally adopted was *B. B.* standard semigloss wall paint with carbon gray and ocre. A test of the reflection coefficient of this paint indicated a value of 48%.

In some of the private offices the ceilings are painted with zinc and oil, stippled, and of a light

Illumination of 18.7 Foot-Candles Provided in Drafting Room.

cream color. Other ceilings are unpainted. A smooth flat-white putty-coat plaster finish was adopted. Floors in the buildings are brown copperstone. The woodwork is in brown mahogany and birch. Eight of the 10 office floors of the building are now occupied and the lighting system is in successful operation. No localized lighting of any kind is used by the thousand employes working under the diffused lighting system.

Some foot-candle readings taken 3 mo. after the installation was put in service show the average intensities to be as follows: Typical office space, 10.2 foot-candles; drafting room, 18.7 foot-candles; corridors, 0.9 foot-candles, and president's office, 11.3 foot-candles. The uniformity of the illumination is shown in an accompanying chart. The conditions under which the test was made to show the uniformity are as follows:

Outlet spacings are 9 ft. 4 ins. by 8 ft. 9 ins.; ceiling heights are 10 ft. 10 ins.; suspension distance from top of reflector to ceiling is 2 ft. 6 ins.; one 200-watt lamp per fixture is used in the office space, and one 300-watt lamp per outlet is used in the drafting rooms.

The fact that the installation has been in use for a number of months, and that a single complaint has not been made by any of the employes, indicates that the building committee made a good choice in selecting the lighting system for this important central station company.

Typical Private Office Lighted to Intensity of 10.2 Foot-Candles.

NEW RADIO PLANT ABOUT READY TO OPEN FOR SERVICE.

The world's largest and most powerful radio plant, the new central station of the Radio Corp. of America on Long Island, will be formally opened for service the latter part of August or early in September. Two of the mammoth wings or spokes of the wheel-like arrangement of the lofty antenna towers are complete. A total of 12 steel towers, each 400 ft. high, comprise the two wings of one operating unit. When the entire station is complete there will be 12 of these wings. The total distance between the end towers of the complete unit is approximately 3 mi. In the center of these 12 towers stands the central power house, which is now fully completed, so that in reality it will be the focus or hub of the entire system when future wings are added. Two of the 200-kw. Alexanderson high-frequency alternators have been installed ready for operation.

The present unit is designed to communicate with Europe and will considerably aid the present high-power radio stations located at Marion, Mass., and at New Brunswick, N. J. Later on communication will be established with South America. The receiving station designed to operate in connection with "Radio Central" is located at Riveshead, L. I., which is about 17 mi. from the big plant. This receiving center is capable of intercepting six different messages simultaneously. The control system in use there is unique in that there are no actual receiving operators present. The aerials pick up the signals, special apparatus in turn directs these to a regular land wire, and finally the messages are received at 64 Broad street, New York City. This system thus offers extreme flexibility of operation and permits of speedy and accurate communication from Europe.

This modern receiving plant marks the climax of investigation started some time ago when radio engineers looked over the map of Long Island and found a site sufficiently in the wilderness to allow various tests over stretches of ground and were able to obtain the most effective reception from distant stations, such as those located at Nauen, Germany; Stavanger, Norway; Towyn, England, and Lyons, France.

NEW 2000-HP. TURBINE UNIT FOR OKLAHOMA UTILITY.

Work has been started on improvements at the Enid (Okla.) plant of the Oklahoma Gas & Electric Co., which will increase the electric production capacity of that division 150%. Chief of the improvements, which will cost approximately $130,000, is the installation of a new 2000 hp., steam turbine, giving the plant a total capacity when completed of 3350 hp. The plans include extension and enlargement of the power house, installation of additional boiler capacity, a new switchboard and voltage regulators. The improvements were made necessary by the company's rapidly growing business and with the recently acquired contracts for serving Billings, Lamont, Hunter and other sections, the increased capacity was imperative. Reconstruction and reinforcement of some of the company's high-tension transmission system is also under way.

Lighting Fixtures Displayed Under Natural Conditions

Toledo Electrical Concern Establishes Studio in an Old Manse in Residence District and Exhibits Various Types and Units to Advantage in Natural Surroundings Attractive to the Customer

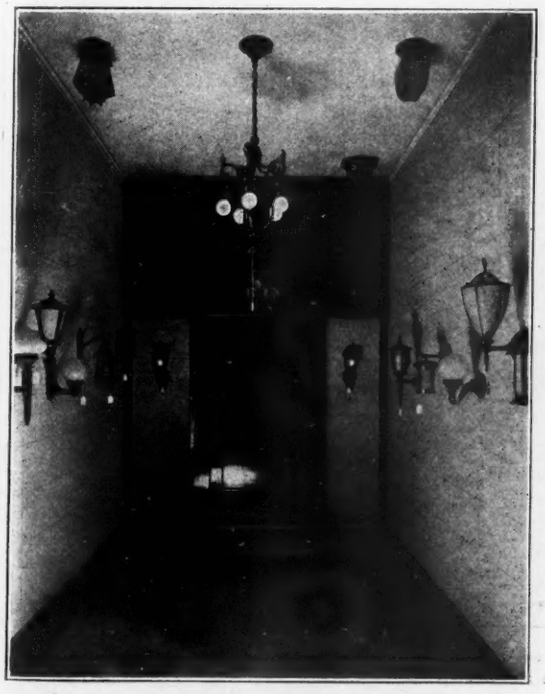
By E R. GILLET

Manager, Lighting Fixture Studio, The F. Bissell Co., Toledo, O.

In casting about for a suitable location in which to display lighting fixtures and supplies The F. Bissell Co., Toledo, O., selected a palatial old residence a short distance from the business center of the city, but on a popular thoroughfare almost directly opposite Toledo's handsome new post office, and passed by an almost continuous stream of automobiles.

This building covers the greater part of a lot with a frontage of 100 ft. on Jefferson avenue and 238 ft. on 13th street. There The F. Bissell Co. has established an electrical lighting studio that could well be emulated. Twelve display rooms of various sizes have a total of 3400 sq. ft. In the old library of this edifice are 125 ft. of bookcases which The Bissell Co. has converted into showcases for the display of illuminating glassware, silk and parchment shades, candlesticks and novelties.

The woodwork of the bookcases and the rooms is solid cherry. Each room is handsomely papered, with curtains and draperies of appropriate design and color. The salesrooms are all carpeted. Each fixture is on separate control so that the attention of the customer may be concentrated upon the particular unit the salesman desires to emphasize at the time.



Effective Display of Porch Lighting Equipment.

Fixtures Are Classified and Displayed in Their Appropriate Rooms.

All the living room and diningroom fixtures are displayed in their separate rooms, these particular rooms having been the living room and diningroom used by the former tenants. The fixtures are classified for price and character. For porch lights there is a room in which a false entrance has been installed with a composition floor and caen stone walls, thus furnishing an excellent setting for the display.

Every detail of a modern bathroom furnishes the setting for the display of bathroom fixtures. Likewise, a large room is fitted up as a modern bedroom for showing the fixtures appropriate to that part of a domicile. There is a spacious old-fashioned reception hall on the first floor which provides the best of facilities for welcoming visitors, and is also a wonderful display room.

From the moment a visitor approaches the entrance of the house he or she is impressed with the fidelity to natural conditions under which the different types and styles of fixtures are shown. What modern features were lacking in the old manse have been supplied without detracting from its architectural appointment or giving it too much of a commercial aspect. The general atmosphere thus provided has a wonderful effect upon the customer and results in a type and volume of sales almost impossible in an ordinary salesroom downtown without calling for the most intensive kind of sales talk. In fact, the fixtures thus displayed by The Bissell Co. practically sell themselves.

Facilities Not Possible in Most Business Houses Are Provided Here.

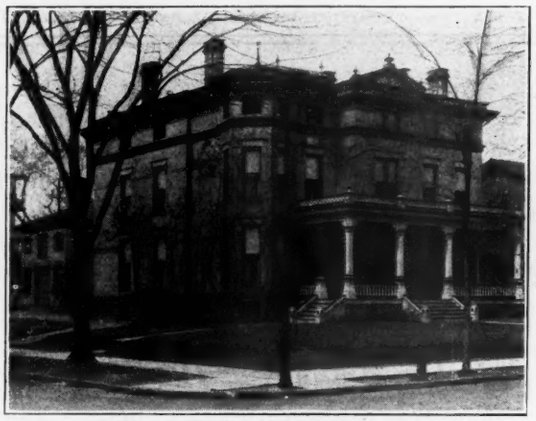
One room is set aside and equipped for the display of commercial lighting units and accessories of the types and sizes handled by the company. There is another room arranged for "X-Ray" indirect lighting and for Curtis portables.

In addition to the display rooms there is a general office, an office for the salesmen and another for the manager. The exterior of the main building is beautified by running and creeping vines that cling to the brick work, and by flowers and shrubbery in the yard about the house.

In the rear of the studio there is a 2-story

Views Showing Various Types of Residence Lighting Fixtures Displayed in the Rooms of an Old Manse Equipped as a Fixture Studio.

brick garage and shop 25 by 45 ft. In addition to the garage, on the first floor there has been established the receiving and shipping room, with bins for completed orders. On the second floor



Exterior View of Bissell Fixture Studio in Toledo, O.

there is a modern, well-equipped, up-to-the-minute shop for the manufacture and assembly of fixtures. There is also a spray room 10 by 10 ft.

Consideration for the tone of the surroundings is indicated by the ample room accorded to avoid crowding the display rooms inside as well as out, an important feature in the sale of lighting fixtures. There is plenty of sunlight and fresh air in and about the studio, and the system of ventilation provides inviting coolness on the hottest days.

The reception hall first attracts the attention of visitors and makes a wonderful impression because it has been kept as near as possible to its original purpose—a reception hall. In this hall is installed a table and chair for an attendant who is always on duty to offer the courtesies of a home, with a telephone and chairs for visitors. Anyone failing to make a good selection of fixtures under these circumstances would have to be devoid of an eye to the fitness of appropriate settings for proper illuminants.

GAIN SHOWN IN APPLIANCE SALES OF PUBLIC SERVICE CO.

A considerably larger number of electric ranges have been sold so far this year by the Public Service Co. of Northern Illinois than in the corresponding period of 1920. A series of intensive campaigns were carried through last month in parts of the territory where there is no gas service. Demonstrations of the accomplishments of the appliance were made. Extensive newspaper advertising was done in the towns where these exhibits were given, as well as in surrounding towns, supplemented by mail and telephone communications. The sales were excellent. In a number of cases people came from a distance of 25 mi. to study the range in operation. More campaigns are planned for other parts of the territory during the coming months.

The general retail merchandise sales record for July, both in number of appliances and in terms of money, are ahead of July, 1920, with indications that are interpreted by the department most closely concerned to mean the impetus given will continue to grow in strength. Excepting as to washing machines, which have not moved out in such large numbers as in 1920, sales of all appliances are heavier. In the cases of some the total sales are 40% more than in the period of 1920 with which comparison is made. Included in this classification are flatirons, toasters, percolators, grills, etc. The demand has affected favorably articles which ordinarily are slow of sale during the heated term, such as heating pads. The hot weather of the month, of course, greatly increased sales of electric fans. In fact, their distribution has been the largest for years. All the appliances sold, it is learned, are performing considerable service.

WESTERN ELECTRIC CO. EQUIPS A CLEVELAND SKYSCRAPER.

Practically all of the electrical equipment for the Hanna building, Cleveland's newest business structure, was supplied by the Western Electric Co. It included $22,000 worth of "Duplexalites," a major theater switchboard for the Hanna theater annex, a complete layout of distributing panels for the building's power and lighting sys-

Hanna Building, Cleveland, Equipped by Western Electric Co.

tems, and several thousand items of conduit. outlet boxes, receptacles and switches. The pumping and ventilating apparatus is driven by Western Electric motors.

The Western Union Telegraph Co., 195 Broadway, New York City, is considering the construction of a new cable ship, 329 ft. in length, of Diesel-electric type of propulsion. Plans and specifications are now out for bids.

EDITORIAL COMMENT

Who Should Lead in Illuminating Standards?

Every forward movement that results in real accomplishment is fostered by some one individual, group of individuals, or group of organizations having confidence in their purpose and determination to carry it through. A great deal has been said in the past 2 or 3 yrs. about higher intensities of illumination, and a number of most successful real demonstrations have been made of the material benefits resulting from improvements in the lighting standards. Many advocates of good lighting have talked long and loudly on the subject without giving their argument the backing of having their own business house properly and adequately provided for in accordance with the standards recommended for others. There is no argument so effective as the investment of real cash, and the man who backs his words with his dollars is the man who makes his money talk.

The Detroit Edison Co. believes in good lighting. It believes in lighting that is much beyond the average standard utilized by its customers, and it is backing up its belief with its own money. The new office building of the company is lighted to a much higher intensity than has been deemed essential for office space until within the past 2 or 3 yrs. In the Feb. 12, 1921, issue of ELECTRICAL REVIEW appeared information secured in a survey of the illumination of a number of great department stores. None of these stores is provided with illumination of as great intensity as is provided in the new Detroit installation. The work done in connection with the store investigation convinced the merchants that better lighting was decidedly to their advantage, and the central station companies supplying service to these stores found that this belief in better lighting took material form and made itself evident at the end of each month.

With such evidence at hand there is no longer any excuse for hanging back. Every central station company that has not already pushed up its own standard of illumination should do so at once. We are still far below daylight standard, and we are also far below the point of too much light, if such a point exists with the means at our command. With the public and private offices, store rooms and plants of the central station companies well and properly lighted every company will then have at its command a number of ever present "permanent lighting demonstrations," and each one of these "demonstrations" will carry the "punch" of conviction. It might be well to have a demonstration room where it is possible to show how not to use light, but every remaining square foot of space occupied by the utility company should be a square foot of demonstration space for good lighting.

Suitable Methods of Illumination

In looking through a bound volume of the ELECTRICAL REVIEW for 1906 we came across the following editorial, and it is reproduced here because we believe many of our readers will be interested in seeing what was said on the above named subject 15 yrs. ago.

"Much has been said of late about the proper methods of illumination and the ways in which we should endeavor to obtain it. We have, it is true, allowed this art to lag sadly behind others —in fact, it has been almost entirely neglected. Those who have given some thought to the matter have worked rather in the dark and not approached it in a scientific way. Now the subject is receiving a good share of attention. It is being attacked from all sides, and we are learning from experiment the effects of different sources of light, how they should be treated for the best result, and how any desired result may be obtained. A clear exposition of our present knowledge was made at the meeting of the New York section of the Illuminating Engineering Society by Dr. Charles P. Steinmetz who for an hour and a half kept the interest of his audience during a discussion of the physical and physiological phenomena connected with light and the proper methods to be followed to obtain any desired character of illumination. Dr. Steinmetz's wide knowledge, which seems to include something from every branch of science and something about every art, enables him to throw upon these matters an exceptionally clear light and to bring to the subject a great deal of interest.

"One of the most interesting points made in this lecture was that of calling attention to the differences brought about by the different methods of illumination. As a general thing illumination should be more or less uniform, sharp contrasts being avoided. Uniformity may be obtained by diffused light or by direct light. The former case is marked by the absence of shadows, and the latter by sharp shadows.

Neither method is alone entirely satisfactory, the best results being obtained only when they are combined. This is because the eye, while it is dazzled by sharp contrasts, sees by comparison and there should be provided the necessary gradations which enable it to distinguish objects.

"The eye further sees also by colors, so that the necessity of shades is not so great where the color effects are more marked. These are truths which have only recently been recognized.

"Another phase of the illumination problem is that of adapting the various character of light which we now have to the conditions which they suit best, or, rather, to apply in every particular case that type of illuminant which is most effective. For example, in a shop the light should be yellow, because green is not reflected from dark walls. In the parks the reverse is true, because here the reflecting surfaces are green. Further, for inspection work a light may be selected which makes defects more apparent, and a green light is generally better for this.

"We now have illuminants giving us a wide range of character, both as to color and intrinsic brilliancy. The art of producing light, while in some ways backward in that it is hampered by an inefficient method, still is well advanced in other ways—in fact, it is much more advanced than is the art of illumination. It remains for the illuminating engineer to make the most of the various lamps now at his disposal. The efficiency of the lamps will undoubtedly be improved from time to time; in fact, the last year has been productive of a great step forward. But, for the present, this is really a secondary matter as compared with the proper use of the lamps we have."

Much of the advice given in the foregoing will be recognized as still the best that could be offered today. Great strides ahead have been made in the past few years, and the end is not yet in sight. Each new development has opened the way to new progress, so the path still lies open ahead.

The Government and the Railroad Situation

It is difficult to account, on rational grounds, for the opposition said to have been aroused by President Harding's recommendations in his recent special message with regard to the funding of the indebtedness of the railroads to the government. The President's plan avoids various controversial matters and merely provides for acceptance by the government of railroad debentures or other securities, maturing in 10 yrs., in lieu of cash—which the carriers lack and cannot now raise—in payment of the debt due for extensions and betterments made by the government during the period of Federal control of transportation.

The principle of the Harding plan is not challenged. But its opponents choose to confuse the issue by charging those in control of the railroads with an ulterior design—namely, to dump the railroads upon the government—and by alleging that many of the railroads' claims for compensation are spurious or inflated. Further, these congressmen think this is a good time to force the repeal of the indirect guaranty of a reasonable return on the capital represented by the Interstate Commerce Commission's provisional valuation of the roads.

There is no merit in the position of these members of Congress. The investigation of the railroad situation is to be resumed in September and completed as soon as possible. The results of that inquiry will determine the need of amending the transportation act. The funding proposal now before Congress stands on its own bottom. Whatever may be done for or to the railroads by general legislation, the indebtedness that grew out of the government's expenditures on capital account will have to be funded. It should be funded now, to pave the way for a settlement that will give the carriers the money they require for improvements and new equipment.

Simple Diagrams

No method of treatment has done more to assist the engineer or the student of science than the use of diagrams. These present to the eye a picture in conventional form of the apparatus or the performance that is being studied. They are in effect what a theory is to the investigator working over some incompletely understood phenomena.

But to be the most useful a diagram should always be the least complex. It should be as simple as it is possible to make it, and it should not contain an unnecessary line or letter. This necessity is well recognized in the use of diagrams for representing physical forces and quantities, and no effort is spared to reduce them to the plainest form possible. But when the method is used to represent a system such, for example, as the wiring of a building this feature is frequently neglected. The wires are often drawn apparently just as the draftsman happens to think of them, and little regard is paid to their relative positions. The finished diagram seems to be rather a neat copy of the draftsman's first sketch than a finished drawing embodying the results of the sketch with the lines arranged so as to present the clearest possible picture. And even in simpler diagrams little or no thought is paid to proper construction. In such cases much

of the value of the diagram is lost, and a drawing that should be simple is made unnecessarily complex.

These few words are inspired by the diagrams in an interesting little article appearing in an esteemed contemporary, which while they offend, are rather typical of what one frequently sees. One of these diagrams represents the wiring for a motor starting box. One of the armature leads circumnavigates more than three sides of the box and crosses other wires four times, when it could be carried directly to the armature without a single crossing. In another diagram the shunt-field lead, like the king of France, crosses the armature lead at the top of the figure apparently merely for the sake of recrossing it again at the bottom. True, it is not a serious matter, but if a diagram is worth drawing at all it is worth drawing properly; and, if the object be not to assist the student as much as possible it might as well be omitted.

Sell the New Fixtures Now

In just a few weeks now we will be in the midst of fall house cleaning season with its accompanying turmoil in the home. As a rule the housewife emerges from this season of activity with new wall and ceiling finishes, some new paint and varnish, a new rug or two, and the same old lighting fixtures that someone bought away back when the "light plant" was started. And those old fixtures will look entirely out of place against the background of new interior finish and new furnishings.

The paperhanger and the furniture man are not backward in suggesting changes; in fact, the public is so in the habit of redecorating and refurnishing that such business almost comes in without effort to the man who sells wallpaper or chairs. Why should not the householder give himself an occasional treat by spending part of his fall decorating appropriation on some modern fixtures to give improved service and look new along with the new rug? In all probability his walls have been changed many times since anyone has suggested that he can have new fixtures with vastly improved lighting qualities—fixtures that he may select from among designs that are something more than simply a collection of bent tubes and fluted glass.

Every live dealer in fixtures who can spare a few minutes from other duties within the next week should lay out a plan and go after this business. It should pay.

Incidentally, now is the accepted time to obtain a sample of the new elexit devices, designed to make portable the ceiling fixture and wall bracket, and prepare for a campaign of installation.

Brightness of the Electric Spark

The usual photometric methods are not available for measuring the actinic intensity of the electric spark because of the extremely short duration of the light. In a recent issue of the *Comptes rendus de l'Academie des Sciences* (Paris) M. L. Bull describes a number of experiments made to gage the actinic value of the light radiation from an electric spark in terms of a known source of illumination. The sparks used were 1.5 mm. long, and were produced by a discharge between aluminum points.

Since the spark is used as an illuminant only in connection with photography, purely photographic methods were used in comparing its illumination with that of other light sources. A 12-ampere carbon arc lamp was used in the comparative tests. Two separate lens systems were used to project the light from the two sources side by side on the same sensitized photographic plate. The total duration of the spark, as measured by means of rotating mirrors, was found to be 0.000,000,2 sec.

The time necessary for the arc to produce the same amount of blackening of the photographic plate was 0.000,033,3 sec., from which it is concluded that the actinic brightness of the electric spark is 160 times as great as that of the arc, or about 16 times that of the sun which is generally taken as being 10 times as great as that of the electric arc.

State Ownership Rejected

The defeat in the lower house of the Georgia legislature of the constitutional amendment providing for a bond issue for state development and state ownership of hydroelectric power and public utilities is believed to have settled that agitation for some time to come. This movement was fostered by an organization known as the Municipal League of Georgia and has been brought up annually at the legislative sessions. This year the measure was killed by a vote of 30 to 1, which is regarded as so decisive that the subject is believed to have been disposed of permanently.

In combating the agitation for state development and ownership of hydroelectric power and public utilities it was pointed out by representatives of existing power companies and other utilities that the adoption of such an amendment necessarily would result in delay and abandonment of development projects already under way and would make it difficult, if not impossible, for companies to secure additional funds necessary for immediate development of the hydroelectric power needed for the industrial growth of the entire state, and particularly of the larger cities within its domain.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

ELECTRICAL DISPLAYS IN MERCHANDISING FAIR.

The chief electrical attraction at the annual Chicago Merchandising Fair, at the Coliseum, Chicago, this week, was the washing machine exhibit of the Voss Brothers Manufacturing Co., of Davenport, Ia. There was on display in the Voss booth the triple-tub washer while experts from the factory demonstrated the "Sea Wave" copper oscillator with "Thermo" tub.

Portable electrical lamps were displayed in many types and varieties by the Art Novelty Co., Chicago, while a large variety of piano lamps permitted an excellent choice in the booth of Kaplan, Inc., Chicago.

In the booth of Kelly & Reasner, Chicago, was an excellent display of illuminating glassware made by H. Northwood & Co. and the Eagle Manufacturing Co.

The Pelouze Manufacturing Co., Chicago, exhibited and demonstrated a number of electrical devices, including flatirons and toasters.

MILWAUKEE CHOSEN FOR LIGHTING FIXTURE CONVENTION.

Three Fixture Organizations Are Planning to Make Joint Meeting and Fixture Market a Landmark in the History of the Industry.

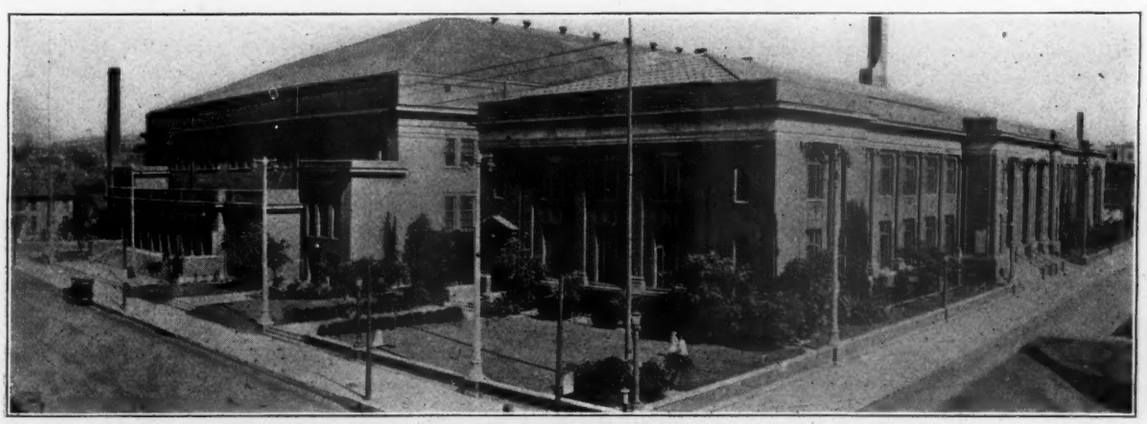
Announcement has been made by Charles H. Hofrichter, secretary of the National Council of Lighting Fixture Manufacturers, that the next convention and Lighting Fixture Market will be held in the Milwaukee Auditorium, Milwaukee, during the week of Jan. 30 to Feb. 4, 1922. The anouncement as sent out from the Cleveland headquarters of the organization is as follows:

Plans are now well under way for a "Better Lighting Week" that will completely eclipse all previous efforts by the three fixture organizations along this line. Representatives of the National Council of Lighting Fixture Manufacturers, of the Dealers' Association and of the Glassware Guild, recently met in Milwaukee to go over the ground and make preliminary arrangements for their joint convention. The Milwaukee Auditorium, a mammoth building covering an entire city block, has been engaged. This structure is owned and operated by the municipal authorities who are working hand in hand with the Convention Committee to make this occasion an unprecedented success.

The huge size and modern equipment of this building makes it ideal for convention and exhibition purposes. The main hall, or arena, has a seating capacity of over 8000 persons and exhibition space of 29,423 sq. ft. Directly beneath is Mechanics Hall, the main exhibition room, 256 ft. long by 184 ft. wide, completely equipped with wiring for both a-c. and d-c. currents. This room has 46,800 sq. ft. of exhibition space and will hold more than 150 large booths. Six other smaller auditoriums give the building a total of 104,952 sq. ft. of space for exhibition purposes and seating capacity for 13,520 persons. It has a highly convenient location in the very heart of the city, being in close proximity to the best hotels, business and amusement places. The people of Milwaukee are gratified at the prospect of having the convention in their city and will cooperate in making it a pleasurable and profitable affair.

It is too early to be able to announce all the plans in detail. But the conventions will be the occasion of the usual pleasurable lunches and addresses that have marked past conventions, for the holding of which the Auditorium is unusually well equipped. As a unique feature of this convention there will be a gorgeous pageant showing the stages in lighting from the crude flaring torches of the primitive ages on through the periods of history to the most scientific and artistic achievements of today.

Nothing is being left undone to make the Mil-



Milwaukee Auditorium Where 1922 Lighting Fixture Market Will Be Held.

waukee Convention and Fixture Market a landmark in the history of the industry. The exhibits will be taken care of better even than in past markets, the booths will be more attractive and conveniently laid out—in fact, it will be an occasion which every one will remember with gratification.

CONTRACTOR-DEALERS PERPETUATE NATIONAL CONFERENCE.

Electrical Men to Have Important Part in Annual Congress of Retail Merchants—Proceedings of First Meeting, Chicago, Aug. 4-5.

At the close of the last session of the Electrical Contractor-Dealer Conference of the National Congress of Retail Merchants, held in Chicago, Aug. 4-5, a resolution prepared by the Committee on Resolutions, A. A. Gray, chairman, was unanimously adopted to make the Conference an annual affair and to invite other branches of the electrical industry to participate. The text of the resolution follows:

Resolved that in the opinion of the delegates present, the plan for holding a national meeting of the electrical trade at Chicago once a year be indorsed, and;

Whereas, the rapidly broadening use of electricity both in city and rural districts, and the need for uniform methods of merchandising electrical utilities requires a deeper study of these problems, and;

Whereas, this Congress, to be held annually hereafter at Chicago, will afford the desired intercourse and exchange of information and development of standardized methods, and;

Whereas, the development of the use of electricity and the merchandising of accessories appertaining thereto will be quickened by the co-ordination of every element concerned in this development, and;

Whereas, the ultimate use of electrical energy depends upon its universal acceptance in every part of the country, such a Congress participated in by every element of the industry will reveal greater opportunity for the utilization of electrical energy in communities adjacent to central-station service and in those communities far removed from transmission lines or central sources of power.

Therefore, be it resolved: that a permanent organization under the auspices of the Chicago Association of Commerce be formed and an invitation extended to all organizations representative of the various elements within the industry to participate in the Congress, at the city of Chicago, at a date to be later determined.

At the opening session of the Conference Aug. 4, Chairman C. A. Tupper dwelt upon the problem of farm service for a minute, pointing out the awakening desire of the agricultural communities for electric lighting and power. It was suggested that every isolated farm-lighting plant that is sold serves to prepare the user for the service of the central-station transmission lines when they come his way and he finds the latter service is more economical and certain.

In his discussion of the subject, "Merchandising Problems in the Electrical Industry," A. A. Gray, president, A. A. Gray Co., Chicago, said that many people are learning to turn to the contractor-dealer for their electrical appliances after sad experience with goods of inferior quality which unscrupulous manufacturers had unloaded upon uninformed department store buyers. The text of Mr. Gray's paper will appear in an early issue of ELECTRICAL REVIEW.

"Honesty is the best policy we have in the contractor-dealer business because it has not been used enough to hurt it," said A. I. Clifford, secretary of the Indiana State Association of Electrical Contractors and Dealers, whose paper was entitled "Economic Relationship of the Electrical Industry." Mr. Clifford's paper will appear in an early issue of ELECTRICAL REVIEW.

GOODWIN CONDEMNS VARIOUS FACTORS AS OPPOSED TO CO-OPERATION.

"Efficiency has destroyed convenience; hence the great economic waste," said W. L. Goodwin in discussion of co-operation as applied in the electrical industry. He divided the industry into seven branches—public utilities, manufacturers, jobbers, dealers, the engineering group, the financial group and, finally and most important, the public.

"We do not seem to be able to discriminate between co-operation and individual effort," said Mr. Goodwin. "Any co-operative scheme, to be effective, must not destroy individual effort. The more we encourage individual effort, the more we create co-operative effort. The crying need of the industry today is specialists in generalization. The trouble with co-operation is that it has been placed in the hands of impractical people who do not know how to bring about results. Commercial co-operation is practical if placed in practical hands. No one person can effectively bring about the co-operation of all branches of the electrical industry. The public mind has become confused and there is immense waste in manufacturing because of the lack of co-operation in standardizing electrical devices. This failure to co-operate is holding back electrical development. Even financing is affected. Electrical men are the poorest investors in electrical securities and, as a consequence, the public is skeptical. There are two kinds of co-operation—voluntary and compulsory. Do we want to wait until the government compels co-operation through taxation?

"Co-operation does not prevent competition but it does create and encourage intelligent competition if properly set up. Contracting is nothing but a merchandising problem, but it has become a gambling game. The street railway industry is a merchandising problem but the men who operate them fail to realize this and, instead of studying and practicing sales effort, they have degenerated into apologists."

W. L. Ware, trade commissioner for the Chicago Association of Commerce, told of the plans and policies of the National Retail Congress and predicted that the meetings this year would lay the foundation for tremendous and successful meetings each year in the future. He then told the contractor-dealers how a certain dealer had sold him an electric ironer and had, by the way of promoting service and close relationship with his customers, continued for 2 yrs. to call him up by telephone and inquire as to the condition and performance of the machine. Mr. Ware said that future meetings would be known as the "Interstate Merchants' Council." He said that a campaign was now in progress for this feature, in which the electrical people are well represented.

"Sales pressure must consist of information that will create in the minds of people the desire to buy," said Charles Henry Mackintosh, Chicago, president of the Associated Advertising Clubs

of the World, in his address on "Ohm's Law Applied to Marketing Electrical Specialties." He illustrated the buying idea by using the word "IDEA" as an anagram—"I" for interest which must be gotten first; "D" for desire, which must be created after interest is obtained; "E" for enthusiasm, which the prospect must be warmed up to before obtaining "A" for action, in which the prospect buys. Sales resistance on the part of the prospect was classified in six points—unwillingness or inability to respond to the buying idea; ill-will created in the mind of the prospect toward the salesman; an opposing will or interest on the part of the prospect; poverty, miserliness and, finally, deficient education on the part of the prospect.

"In many cases sales are lost because the line of sales talk is too technical and 'over the heads' of the prospects," said Mr. Mackintosh. "They don't want to buy ohms, amperes or volts—sell them time saved, ease, cleanliness, comfort and economy. Whatever is said in sales talk must be said in terms of the customer. Put yourself in the customer's place."

"Character is capital and opportunity is work," said B. F. D. Allen, Allen Electric Co., Lexington, Ky., who presented a paper on "Building Up a Business." This paper, which was received with much enthusiasm and was punctuated with pointed epigrams, will be presented in an early issue of ELECTRICAL REVIEW.

"The kilowatt is the contractor-dealer's one surest and best opportunity today," said William B. Eastwood, associate editor of ELECTRICAL REVIEW. "The more kilowatt-hours registered by the watt-hour meter in the basement of the consumer, the greater his monthly bill to the central station—and incidentally the more comfort, convenience and pleasure he obtains from the lights and appliances sold him by the contractor-dealer."

W. H. Morton, business manager of the National Association of Electrical Contractors and Dealers, was unable to be present but sent an excellent paper on "What the National Association Has Done to Improve the Contractor's Opportunity as a Business Man," which was read by Chairman Tupper. This will be printed in full in an early issue of ELECTRICAL REVIEW.

Howard Ehrlich, president of the Electrical Trade Publishing Co., presented an able paper on "How the Jobber Can Help the Contractor-Dealer." He pointed out two problems which he said were of prime importance to the contractor-dealer. Mr. Ehrlich urged that every dealer install a first-class service station in his store because he is the logical repairman for electrical apparatus. The second factor was the urgent necessity of discounting time paper so that his credit does not become impaired.

"Washing Machine Markets," a paper of great value to contractor-dealers, was read by E. B. Seitz, secretary of the American Washing Machine Manufacturers' Association. This will appear in the August 27 issue of ELECTRICAL REVIEW.

"Live and *help* live," was the slogan renewed by Samuel Adams Chase, special representative of the Westinghouse Electric & Manufacturing Co., who held his audience with intense interest while he talked on "Results Obtained Through Harmonizing the Industry." He presented the following thought:

"Living is giving. All life is an interchange—you get back only what you have given. Business in the last analysis is *service,* and service is only another name for giving."

The address by Ben Tousley, of the Electric Outlet Co., New York City, on "The Outlook in Outlets," is presented in full elsewhere in this issue of ELECTRICAL REVIEW, as is also the address, "Does the Contractor Buy or Sell a Job," by J. W. Collins, secretary of the Electrical Contractors' Association of Chicago.

JOINT CONVENTION WILL BE HELD AT GLENWOOD SPRINGS.

The 18th annual convention of the Colorado Electric Light, Power and Railway Association, together with the second annual convention of the Rocky Mountain Geographic Division of the National Electric Light Association, will be held at the Hotel Colorado, Glenwood Springs, Colo., Sept. 19-21. M. R. Bump, president of the National Electric Light Association, will be in attendance. The program is now in course of preparation and is in charge of T. O. Kennedy, Denver Gas & Electric Light Co., chairman of the Program Committee.

NEW YORK CONTRACTOR-DEALERS HOLD ANNUAL OUTING.

Members of Recently Merged Local Organization Gather at Staten Island Resort and Present "Bill" Goodwin With Loving Cup.

The Independent Associated Electrical Contractor-Dealers of New York City held its summer outing at Grand City, Staten Island, July 30. The occasion is noteworthy and will go down in history as the first annual outing of the organization which is the result of a recent merger of the Associated Electrical Contractors and the Independent Electrical Contractors and Dealers Association. The presentation to W. L. Goodwin of a huge silver loving cup as a token of esteem and devotion introduced a personal note which will further enrich the memory of the outing for those who had the pleasure of attending.

While this was the first outing of the merged organization it was the 17th outing of the old Independents who followed the usual custom of entertaining the New York City Department of Water Supply, Gas and Electricity and the Fire Underwriters. The merged organization has a total membership of 130, making it the largest local organization in that branch of the electrical industry. The popularity of this organization is shown by the attendance of something like 400 members and guests who, in addition to enjoying the other amusements provided, sat down to an old-fashioned shore dinner.

Mr. Goodwin was the guest of honor and the presentation of the silver loving cup came as a complete surprise to him. He made acknowledgment in a characteristic speech, assuring the donors that while the spirit which prompted the gift was fully appreciated, he considers his efforts a duty and a pleasure, and entertains no

thought of obligation on the part of those who enjoy the benefits. Mr. Goodwin evinces no slight evidence of pride in displaying this magnificent tribute to the work he has done, to callers at the offices of the Society for Electrical Development in New York City, where he now holds forth as the right-hand man of the president of that organization.

NEW JERSEY CONTRACTOR-DEALERS OUTING AT ASBURY PARK.

The feature of the annual outing of the New Jersey State Electrical Contractor-Dealers Association held at Asbury Park, N. J., on Saturday, July 30, was that the program presented only one address by a prominent speaker instead of as in former years a half dozen brief talks on a variety of topics and the consensus of opinion was that this innovation was most commendable. Forty contractor-dealers were present at the business meeting called at noon and at the afternoon session Ainslie A. Gray gave an interesting address on "Advertising." He spoke of ways that the contractor-dealer can tie in with national and local advertising through proper co-operation with the jobber and showed about 40 specimens of the co-operative advertising of jobbers in various parts of the state wherein their contractor-dealers are mentioned. In conclusion Mr. Gray urged contractor-dealers to realize the large amount of business to be secured by those who can take care of it and go after it in the right way.

The rest of the afternoon was devoted to a 5-inning baseball game between two teams composed of contractor-dealers and jobbers. The latter won by the score of 5 to 3 and the winners, captain of the losers and the umpires were presented with silver belt buckles by O. Fred Rost, general manager of the Newark Electrical Supply Co. The shore dinner held at 6:30 o'clock was partaken of by 150 persons, double last year's attendance, and late in the evening the start for home was made with all terming the entire affair a huge success.

OKLAHOMA GAS & ELECTRIC CO.'S CLUB IDEA SPREADS.

The Oklahoma Gas & Electric Co. employes' club, which is now 10 yrs. old is said to be the oldest similar organization in the state. Its success has caused it to be copied in a general way by many other industries and numerous Oklahoma City business firms have taken up the O. G. & E. Club idea in one form or another. The latest advocate of employes' clubs is the Rock Island railroad, the Oklahoma City employes of which have formed a club along similar lines.

PUBLIC SERVICE SECTION, N. E. L. A., TO MEET.

The annual election of the Public Service Section of the National Electric Light Association will be held in Chicago next month. In accordance with the rules and following the method of the past few years it will be an open election; that is to say, no nominations will be made. Ballots will be cast by the members for their individual candidates.

COMING CONVENTIONS.

Michigan Electric Light Association. Annual convention, Ottawa Beach, Mich., Aug. 24-25. Headquarters, Hotel Ottawa. Secretary, Herbert Silvester, Ann Arbor, Mich.

First National Radio Exposition, Broadway Armory, 5875 Broadway, Chicago, Aug. 30-Sept. 3, under auspices of the American Radio Relay League. Show derector, N. E. Wunderlich, 4533 North Sawyer avenue, Chicago.

New England Geographic Division of the National Electric Light Association. Annual convention, New London, Conn., Sept. 6-9. Headquarters, Hotel Griswold. Secretary, Miss O. A. Bursiel, 149 Tremont street, Boston.

International Association of Municipal Electricians. Annual convention, Colorado Springs, Colo., Sept. 6-10. Secretary, Clarence R. George, Houston, Tex.

Pennsylvania Electric Association. Annual convention, Bedford Springs, Pa., Sept. 7-10. Secretary, Henry M. Stine, 211 Locust street, Harrisburg, Pa.

National Exposition of Chemical Industries, Eighth Coast Artillery Armory, New York City, Sept. 12. Secretary, Charles L. Parsons, 1709 G street, N. W., Washington, D. C.

Great Lakes Geographic Division of the National Electric Light Association. Annual convention, French Lick Springs, Ind., Sept. 14-16. Secretary, R. V. Prather, 305 De Witt Smith building, Springfield, Ill.

Indiana Electric Light Association. Annual convention, French Lick Springs, Ind., Sept. 14-16.

Rocky Mountain Geographic Division of the National Electric Light Association and the Colorado Electric Light, Power and Railway Association. Joint annual convention, Glenwood Springs, Colo., Sept. 19-21. Headquarters, Hotel Colorado. Secretary, Minnie B. W. Baker, 900 Fifteenth street, Denver, Colo.

Association of Iron and Steel Electrical Engineers. Fifteenth annual convention, Chicago, Sept. 19-24. Headquarters, Hotel La Salle. Secretary, John F. Kelly, Empire building, Pittsburgh.

West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers. Annual convention, Huntington, W. Va., Sept. 20-22. Secretary, Herbert Smith, 212 Robson-Pritchard building, Huntington, W. Va.

Illuminating Engineering Society. Annual convention, Rochester, N. Y., Sept. 26-29. Headquarters, Powers hotel. General secretary, Clarence L. Law, 29 West 39th street, New York City.

American Electrochemical Society. Meeting at Lake Placid Club, N. Y., Sept. 29-Oct. 1.

New York Electrical Show, 71st Regiment Armory, Park avenue and 34th street, New York City, Sept. 28-Oct. 8. General manager, George F. Parker, 124 West 42d street, New York City.

Cleveland Section of the American Society of Mechanical Engineers. Great Lakes regional meeting, Cleveland, Oct. 3-4. James Guthrie, Fidelity building, Cleveland.

Indianapolis Industrial Exposition, Indiana State Fair Grounds, Oct. 10-15, under auspices of the Indianapolis Chamber of Commerce. Chairman, O. B. Iles, Chamber of Commerce building, Indianapolis.

Southeastern Geographic Division of the National Electric Light Association. Annual convention, Chattanooga, Tenn., Oct. 18-20. Headquarters, Signal Mountain Inn. Secretary, Charles A. Collier, Electric and Gas building, Atlanta, Ga.

Electrical Exposition, Auditorium, Milwaukee, Oct. 25-31, under auspices of the Milwaukee Chapter of the Wisconsin State Association of Electrical Contractors and Dealers, in connection with the Third Annual Food and Household Exposition, directed by the Milwaukee Journal.

National Council of Lighting Fixture Manufacturers. Annual convention and Lighting Fixture Market, Auditorium, Milwaukee, Jan. 30-Feb. 4. Secretary, Charles H. Hofrichter, 231 Gordon Square building, Cleveland.

CONTRACTOR-DEALER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-keeping for the Dealer in Electrical Goods

DOES A CONTRACTOR BUY OR SELL A WIRING JOB?

Discussion of Methods in Electrical Installation Work at the Contractor-Dealer Conference in Session in Chicago, Aug. 4-5.

By J. W. COLLINS,

Secretary, Electrical Contractors' Association of Chicago.

Does a contractor buy or sell a job and are we poor merchandisers, by reason of being poor contractors? A wiring job is solely to accommodate the use of appliances and apparatus, and the merchandising of such is a prime factor in the job.

Buying or selling an electrical installation can be very easily distinguished by the manner of the contractor's approach. A contractor who just counts up the unit symbols on a plan and spends the balance of his efforts attempting to ascertain, and if possible meet his competitor's figures, is a buying bidder in every sense of the word. On the other hand, a contractor who takes the plan and specification as a starting point in the transaction and then competes on a basis of ultimate result, such a man is a selling bidder.

We, as contractors, have as a rule fallen into the buying-bidder class and possibly we can be forgiven to some extent when we visualize the growth and progress of the industry. We are part of an industry that has developed from nothing to a near necessity in one generation. This development has been almost too rapid for those constantly engaged in the work to keep apace. That is proven by the fact we already have become disintegrated into groups of specialists.

If this is true, how can we expect an architect or a general engineer to keep abreast with this advancement? We find plans and specifications of a stereotyped or multiple-copy nature, showing only such advancement as experienced by the individual organizations. We can't expect much else when we realize that each of these organizations is attempting to keep abreast with possibly 50 other construction and operating factors that make up the building and manufacturing industries.

NECESSITY FOR CLEAR AND MORE MODERN SPECIFICATIONS FOR INSTALLATION.

Take the average specification for the electrical installation as we find it today. It will be found that 75% of it is devoted to rules of inspection and underwriters' specifications for approved material. All of which is superfluous, as common practice establishes such standard.

This could be corrected by some organization establishing a handbook of pointed paragraphs covering all units common to the several distinct classes of construction. These paragraphs could be numbered, greatly assisting the architect or engineer in formulating a specification. He could dictate by paragraph number, using only such data as necessary to properly and uniformly direct the estimating and construction of the work.

Such a handbook would be welcomed by our architects and engineers and could be circulated at a very small cost. The Society for Electrical Development should be interested in a proposition of this nature and I would be more than pleased, if this matter is worthy of the contractor-dealers' sanction, to take the matter up in detail with W. L. Goodwin or such of his associates in the work as he may direct.

Give us a clear and modern specification and you will automatically compel us to compete along lines that will develop the contractor to a point where he must be on his toes as to the latest and best in this rapid development. You will create a new factor in the field—the selling-bidder.

ESTIMATING WIRING COSTS BY OTHER THAN NUMBER OF OUTLETS.

Now to prove that the contractor is a poor merchandiser because he is a poor contractor.

Electrical apparatus and appliances in the commercial field as well as the home must correspond to the wiring installation. The contractor must have in mind all the possibilities as to the utilization of the wiring installation in order that his client may enjoy in the fullest measure the helpful convenience of the electrical idea. To properly equip the wiring installation with sufficient and proper points of contact with the apparatus, he must sell the full idea first in order that he may secure the confidence of his customer in his attempt to sell a complete installation.

How many contractors have mastered the fundamental of illumination design to a point that they may carry their customer over the bridge of original cost to a realization of an efficient installation?

How many contractors take their original estimate for home wiring and acquaint their customers with the fact that the service, meter and circuit cost is a constant cost and, unless they utilize the same to the full capacity, they are paying for something of no value to them? Do we ever attempt to absorb this access cost by suggesting convenient outlets at points in the building which by the nature of their location with reference to the specified installation could be installed at a very low cost?

For lack of co-ordination between the two factors that must work hand in hand—construction and appliances—we find our jobs far behind the possibilities that the inventive and manufacturing branch of the industry has made possible for us.

One of the great problems before the industry

today is to teach the contractor how to properly estimate and to sell an electrical installation, particularly in house wiring. I want to take a little of your time with the assistance of a blackboard in an attempt to illustrate my idea of an estimating system that will give the public a fair deal for the money they invest in the installation and will encourage the full use of electrical convenience, because a proper outlet or receptacle is always conspicuous enough to encourage its use. It will do away with one of the strongest arguments of a half sold customer, "Where can I use it?"

NOTE—At this point Mr. Collins turned to the blackboard to illustrate that house wiring cannot be properly estimated by counting the number of outlets. To show the relative constant installation cost, regardless of how many outlets are installed, he drew a 2-apartment building with a provision for 10 outlets. Then he estimated the cost of the service, meter and circuit installations as fixed costs before adding the cost of installing the 10 outlets. It was then pointed out that the installation of 10 more outlets would add proportionately little more to the original estimate, while the additional 10 outlets would pave the way for the sale of more appliances for the greater convenience and saving of time and labor of the householder, this benefiting the entire industry.

Take one of our most commonly used home appliances, the vacuum cleaner. The average home, particularly the general run of apartments, has one wall receptacle in the living room, originally intended for a table or floor lamp to be seen from the street. This, naturally, is located at the extreme boundary rather than the center of the floor area. We may find it possible to reach the entire living room floor from this point, but that is all. The balance of the house must be cleaned by climbing a chair or ladder to connect with a ceiling fixture or pendant. The housewife contemplating this effort, loses a great deal of her electrical enthusiasm and we lose a ready customer for other appliances.

You can't overcome human nature "to do things in a manner most convenient." You must have that human element in mind on the wiring installation or you will never see the contractor-dealer a real factor in this business. This is a manufacturer's problem as much as the contractor's. These circus campaigns of manufacturers must be followed up, and the highly competitive sales policies of specialized appliance dealers will never induce confidence or insure the development to a point of common usage of the electrical idea.

Electricity is not a positive necessity as yet; it is one of the conveniences of life, and as such it is one of the first to feel the rise and fall of the purchasing barometer. It must be stabilized and kept in front at all times by something more stable. Construction needs the appliance influence and appliances must have construction. How are you going to keep the two separated except that you establish outside influence or trade conditions that work one against another to the detriment of both?

I see a world of work ahead for our associations and trade press. I think both institutions have been developed to the point of greatest need, and when we stop to realize that this industry was born and reared in less than one generation we must concede that we are all in a mighty speedy game. We must liken our knowledge to voltage, our efforts as amperage and the result as kilowatts, and hope for a better meter reading each month as we close the books.

CONTRACTOR-DEALER CONFERENCE IS EDUCATIONAL.

Visitor Who Attends Meetings of National Retail Congress Impressed With Opportunities for Spreading Gospel of Electricity.

Some who were not exclusively interested in electricity attended the electrical contractor-dealers' conference of the National Congress of Retail Merchants in Chicago, Aug. 4-5. Among them was one who expresses his enthusiasm and appreciation of the possibilities and opportunities of such gatherings for spreading the gospel of electricity in the following letter:

Editor ELECTRICAL REVIEW:

It was the writer's good fortune to have heard every discourse at the Electrical Contractor-Dealers' Conference. The pleasure and satisfaction in the presence of electrical conveniences around the home can only be measured by your electric bill—the larger it is the greater the use of electrical conveniences—and, listening to the discourses which seemed to cover nearly every subject, I was surprised that one thought had been overlooked.

The spreading of the general knowledge of electricity will, of course, increase the sales of electrical appliances, yet a discussion of propaganda on this subject in the grammar schools was never suggested. I believe that every child leaving grammar school should have a general knowledge of electricity. A little education—insufficient knowledge of electricity—may be thought to be more dangerous than absolute ignorance. But the fact remains that in 95% of the homes where electricity is used, the only knowledge they have is turning the current on or off, and possibly renewing a fuse plug. Yet in these same homes you will find the younger generation making disastrous experiments with the electrical connections, which would not be the case if they had a little knowledge.

You want the co-operation of the public, which is very essential. Music is gradually becoming one of the standard studies in the public schools, and of the coming generation there will be very few with a grammar school education who will not be able to read music. I believe the elementary study of electricity at the same time with practical instructions would result in a greater interest and greater co-operation of the public at large, and particularly to the contractor-dealer throughout the country.

C. E. BRAINARD,
Consulting Engineer.

DEALER CAPITALIZES RADIO PLANT.

Guy Carlton, one of the enterprising electrical contractor-dealers in Bloomington, Ill., has installed a complete radio station in his retail store and is a licensed operator, says *Beardslee Talks.* Every day the Bloomington inhabitants are advised of the correct time, because Guy gets it direct from Washington, via wireless.

During the Dempsey-Carpentier bout the crowds were thick around Guy's store because he got the reports long before the telegrams began to arrive.

This idea should point the way to the value of the electrical contractor-dealer having a radio station and becoming a licensed operator. It has a good many advantages. Such stations cannot only receive the correct time, but also the weather reports and these alone should attract rural trade to the electrical dealer's store daily.

APPLIANCES and DEVELOPMENTS

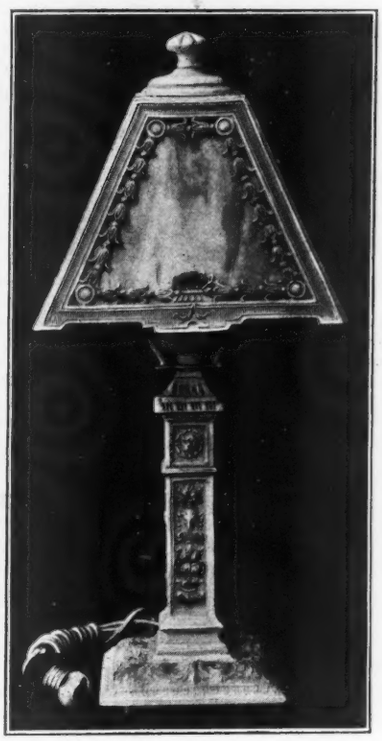
New, Improved or Interesting Electrical and Mechanical Apparatus and Devices, and Applications of Equipment and Methods in Practice

Artistic Boudoir Lamps Made in Four Finishes.

Gradually the value of the portable lamp for decorative and illuminating purposes is being realized and its use becoming more extensive in homes. Bedrooms offer innumerable opportunities for obtaining pleasing effects with boudoir lamps, particularly those manufactured by The Art Metal Works, Inc., 9 Mulberry street, Newark, N. J., 30 yrs. in business and a pioneer in metal art goods, since they are constructed not only of first-class materials, but are of high grade workmanship and artistic design. In addition they are made in four finishes, namely, hand decorated antique ivory; soft-toned Jap bronze; Velasquez bronze (French bronze over hand burnished gold), and polychrome, a blending of rich colors over antique gold.

The unit No. 8814-8815 is an excellent example of splendid workmanship producing a rich, artistic lamp of compact size. It stands 15 ins. high, is only 6.5 ins. wide and is fitted with a 6-panel shade of rich amber iridescent glass.

The accompanying reproduction of unit No. 7009-9087 well illustrates the handsome hand decorated antique ivory finish. The straight lines of this model blend so perfectly that an attractive artistic lamp results. Its height is 16 ins. and width 7 ins., while the 4-panel shade is of amber iridescent glass.



Art Metal Works Unit No. 7009-9087.

Art Metal Works Unit No. 8814-8815.

These are both one-light boudoir lamps and are equipped with flexible cord, socket and detachable plug. A loose-leaf catalog, covering the entire line of products manufactured by The Art Metal Works, Inc., and divided into sections, has been prepared.

Industrial Reflector With Lock Socket.

A reflector-socket is being marketed by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., which is an adaptation of the Pass & Seymour Co.'s socket made by assembling it within a castiron housing, which serves as a holder for any type one-piece Cutter reflector for 200-watt or smaller lamps. This line has been developed to extend the desirable features of holder-socket reflectors to meet the requirements when lock sockets are desired. Complete interchangeability is provided in an installation consisting of both lock-sockets and standard reflector-sockets.

Reflector With Lock Socket.

New Chandelier Booklet Issued by Beardslee Company.

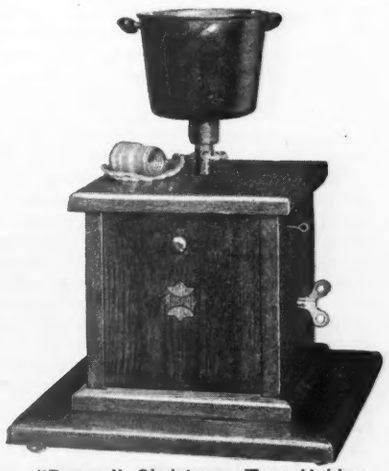
"Home Lighting Suggestions" is the title of a new 32-page 7⅞ by 10½ in. booklet which is being distributed by the Beardslee Chandelier Manufacturing Co., 216 South Jefferson street, Chicago. Chandeliers with brackets to match are shown on the same page and the pages are grouped to bring together designs suitable for any particular room of the home. Hence, selecting appropriate lighting equipment for a living room or dining room is confined to the suggestions shown on a few pages.

Two pages are devoted to illustrations of attractive interiors with appropriate lighting equipment, while the cover portrays, from an actual photograph, a young wife about to light her new chandelier for her chum. It is believed that this new booklet is a decided improvement over previous forms of chandelier manufacturers' catalogs to which the trade has been accustomed.

Christmas Tree Holder Made in Two Sizes.

The Chicago Construction Co., 217 Chamber of Commerce building, Chicago, has recently placed on the market the "Rusroy" Christmas tree holder, which is shown in the accompanying illustration. This device is made in two sizes, model "A" for the home, being equipped with a spring motor, and model "B," a larger holder, suitable for churches, hotels, stores, public buildings, etc., being equipped with an electric motor, mahogany base, nickel-plated casting, etc.

Among the features claimed for the



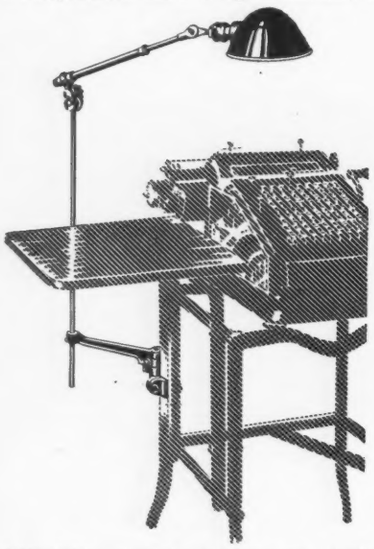
"Rusroy" Christmas Tree Holder.

"Rusroy" Christmas tree holder are: (1) stability; (2) revolving feature; (3) preservation of tree, keeps needles from falling off; (4) automatic electric light connection, continuous contact while turning, and (5) permanence.

The manufacturer has issued a 4-page folder covering the "Rusroy" Christmas tree holder, which gives directions for its use. It is also stated that this holder can be equipped at small cost with a plate instead of the Christmas tree casting, thereby turning it into a smart and attractive display stand.

Adjustable Lighting Fixture for Office Machines.

The O. C. White Co., 15 Hermon street, Worcester, Mass., manufacturer of adjustable electric light fixtures, has



Adjustable Electric Fixture for Adding Machines.

recently added to its line an adjustable lighting fixture, known as style 9M, for attachment to the portable metal stands used for adding and similar office machines. The adjustment features of this fixture are thus enumerated by the manufacturer:

The clamp for attaching the fixture to a metal stand of any type, with round, square, or angle iron legs, is bolted firmly to the leg of the stand at the position desired. The crank-arm of the fixture sets onto the stud of the clamp and is held from lifting off by a turn of the thumb nut. This joint also permits the crank-arm to turn laterally in any direction, giving a wide swing to the entire fixture.

The upright rod is fastened at the proper height by a set screw at the end of the crank-arm. The universal joint at the top of upright permits the lamp arm to swivel about the upright and to swing up or down, without attention to joints or fastenings. A third feature of this joint is the sliding adjustment giving a range for the telescoping lamp arm of from 2 ins. closed to 21 ins. extended.

The lamp can be placed in any desired position by means of the wrist joint at the end of the lamp arm and the universal movement of the telescoping joint. Finally, the shade may be rotated about the socket, reflecting the light onto the work and protecting the eyes of the operator. The lamp stays in the position in which it is placed without attention, or without being in the way, and yet is instantly available for a change to another position as the work may demand.

Ancient Cuban Church Equipped with Large Electrolier.

The most famous of the many churches in Cuba and one of the oldest religious edifices in the Western Hemisphere is the Cathedral of Havana, commonly known as the "Colon Cathedral," according to a writer in *Beardslee Talks*. Construction was begun on it in 1550, 58 yrs. after Columbus discovered the new world. The building is constructed of a chalky sandstone peculiar to the island of Cuba, and its weather-beaten front in the Spanish renaissance style of architecture, is unlike any of the churches in this country. In the interior, which is profusely decorated in many colors, two rows of massive pillars support a lofty dome. At the right of the altar is a small recess in the wall where formerly the bones of Columbus reposed. These relics of the great explorer were removed to Spain at the conclusion of the Spanish-American war.

In the center of the dome of this old church, which was over 200 yrs. old when the Declaration of Independence was signed, a Beardslee chandelier has recently been installed. Hanging from the center of the dome, it measures 10 ft. from the cross at the bottom to the point where it is attached to the suspending chain. The chain is 85 ft. long and the entire fixture from dome to cross measures some 95 ft. The body of the chandelier consists of a cast brass band 54 ins. diam. and is supported by 10 heavy braces, reinforced with decorative pieces between the braces. Thirty-five 8-in. ornamental glass urns for 100-watt lamps are suspended from the cast band and braces. The general design is open and of Romanesque detail and decoration.

This beautiful piece was designed by Robert Neuder of the designing staff of the Beardslee Chandelier Manufacturing Co., Chicago, who has specialized in ecclesiastical and public building work for the past 20 yrs. How well his ideas have pleased the sodality are best told in Rev. Laga's letter, which is reprinted, in part, below:

"I have the pleasure to inform you that the chandelier has duly reached our church and has pleased all the members of the sodality in its magnificence and beauty. It is now hanging from the center vault of the church to the admiration of all. We all feel thankful to you for your beautiful work."

Beardslee chandeliers were recently installed in the Presbyterian Church of Wellsbury, W. Va., and the chairman of the building committee has written as follows: "I am glad to say that the installation has just been completed and is perfectly satisfactory and has received an expression of pleasure

Beardslee Chandelier Installed in Havana Cathedral.

from the members of the congregation."

Rev. Father Francis J. Epstein of St. Michael's Roman Catholic Church at Wheaton, Ill., wrote the following in regard to the Beardslee chandelier recently installed: "Upon my return

Ancient Cathedral at Havana, Cuba, Equipped with Modern Lighting Unit.

from an extended southern trip I found the main chandelier installed in the church. It is indeed an excellent piece of artistic work and redounds to your great credit. You are doing yourself proud by such workmanship."

Single Shell "Red Spot" Has Unique Feature.

A spotlight of the single-shell type is just being placed on the market by the F. W. Wakefield Brass Co., Vermilion, O. Its unique feature is the passing light or "fender insurance," as it has been called. This consists of a ruby lens which transmits an intense beam of red light to the rear; and since it is located on the windshield frame, and at the extremity of the car, it warns oncoming drivers and insures their allowing ample clearance in passing. Few drivers are so reckless as to disregard a red signal light.

While the new "Red Spot" spotlight

Spotlight with Red Signal Glass.

is of the single-shell type, it contains a silver lining to insure a high grade of reflector and to add lasting quality to the unit. Water seepage and ordinary knocking about in service do not injure the reflector nor affect its power and lighting intensity, it is said. Lightness is gained by the careful construction with fine-gage metal skillfully reinforced and by the use of aluminum for the base piece.

Every detail of this attractive and practical accessory has been studied with the greatest care. The manufacturer states that the aim has been to give the trade a spotlight of moderate price, yet worthy of the "Red Spot" name and conforming to the high standards for which Wakefield products are known.

Electric Taper or Candle Lamp for Decorative Purposes.

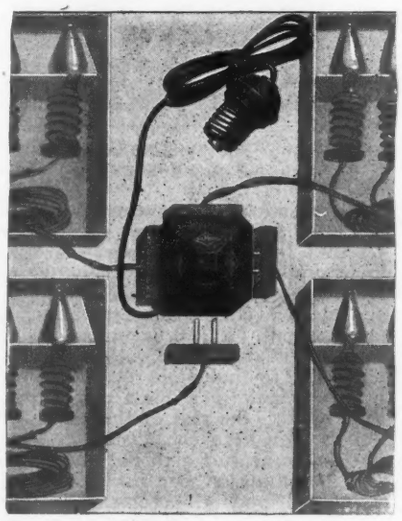
"A Little Light on the Profit Question" is the title of a folder recently issued by the Anthony Wayne Lamp Co., 1016 Savilla avenue, Fort Wayne, Ind., describing the electric taper or candle lamp manufactured by it. Some of the main points of this lamp are thus set forth by the manufacturer:

The size is 1 in. by 6.5 ins. over all; medium screw base. It is neat and of dainty design in frosted glass. It is also made in miniature with base proportionate, suited to occasion and use. This type of lamp is utilized in homes, churches, chapels, lodge rooms, office buildings, high-class show windows, over mirrors in ice cream parlors, at individual tables in hotels and restaurants, for night lights, on Christmas trees and for decorative purposes generally.

Electric Candle Lamp.

Standardized 8-Light Christmas Tree Decorative Set.

Under the name "Diamond-De Luxe" the Diamond Electric Specialties Corp., Newark, N. J., is putting on the market a line of standardized 8-light Christmas tree electric decorative outfits. It is stated that in place of the usual plug



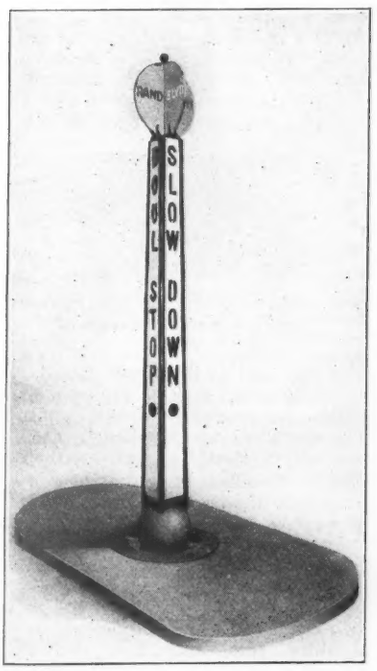
"Diamond-De Luxe" Electric Decorative Outfit.

the "Diamond-De Luxe" device is made with a connector which plugs into the Diamond 4-way distributor exactly as any parallel blade 2-piece plug snaps together.

One of the features of these new outfits is that they can be added to at any time by the user, the manufacturer states. A customer buying a 16-light outfit and finding it too small can purchase another 8-light outfit, snap it into the distributor and make a 24-light outfit. The flexibility of the system suggests that the use of these electric decorative outfits be no longer confined to Christmas tree lighting, but that they will make suitable decorations for Washington's birthday parties, Decoration and Independence Day lawn parties, Hallowe'en parties; in fact, for all festive occasions throughout the year.

Beacon Safety Standard for Highways.

The rapid increase in automobile traffic during the past few years has made it imperative that a device be placed in



Beacon Safety Standard Erected on a Safety Island.

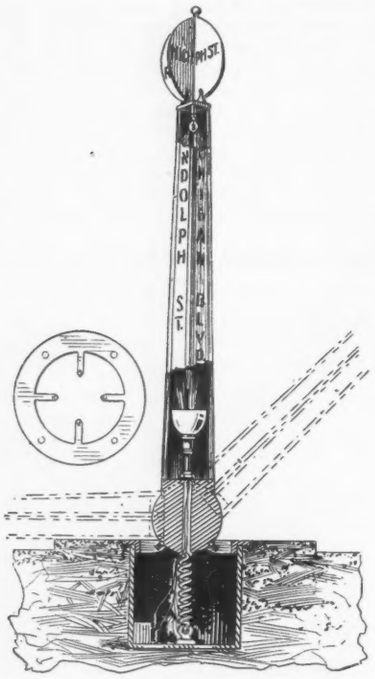
the center of well-traveled streets and highways to keep traffic on the right side of the highway, and to provide a safety island for pedestrians. Various devices have been tried including stationary cast iron and concrete lighting standards but all have been found wanting in one of the two prime requisites of such a safety device, namely, safety and visibility. The Beacon safety traffic post or standard is claimed to combine safety with visibility. It is 9 ft. in height and is illuminated from tip to base.

That accidents do happen where the old style standard of the immovable type is used is evidenced by the records to be found in various cities.

The Beacon safety traffic standard is designed to prevent this loss of life, personal injury and property loss. It is so made that when installed on a safety island it will, on being struck by an automobile, swing over in the line of the force applied by the colliding vehicle. This will happen, it is said, whether the vehicle is traveling at the rate of 15 or 70 mi. per hr.

Every Beacon safety standard is pro-

vided with such visible warnings as, "Go Slow," "Boul. Stop," "Right Turn," "R. R. Crossing," "Speed Limit 15 MPH.," or other wording as may be desired.



Sketch Showing Internal Arrangement of Beacon Safety Standard.

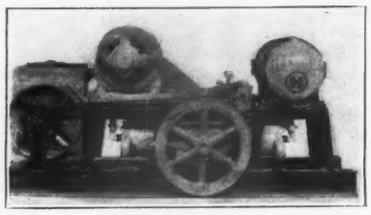
The standard is illumined in red from top to base and may be equipped with a flasher at especially dangerous points. The standards are supplied by the Beacon Safety Post Co., 117 North Wells street, Chicago.

Portable Engine Driven Welding Equipment.

The General Electric Co., Schenectady, N. Y., has placed on the market two types of gas-engine-driven arc-welding sets, one for medium or intermittent duty and the other for heavy duty. Both outfits are well adapted to industrial plants where the work to be done is located in odd places and is not sufficient to warrant the installation of permanent equipments. Their particular field, however, is in places where electric power is either unvailable or inconvenient and costly to bring to it, such as marine work, or for welding experts who own their own set and travel about in localities where there is no electric power.

The medium-duty equipment was designed particularly for intermittent service. The generating unit consists of a type WD 10-4-kw., 1200 r.p.m., 60-20-volt, 200-ampere generator directly connected by a flexible coupling to a Matthews, Model F., 4-cylinder, 4-cycle, 20-hp. gasoline engine. The engine, radiator, generator and welding panel are assembled on a rigid castiron base which, in turn, is mounted on wooden skids. The set is 86 ins. long, 28 ins. wide and has a net weight of about 2000 lbs., making a light and compact affair to move about. The engine used with this outfit has been especially adapted to the requirements of intermittent welding service. It is of the overhead-valve type with the cylinders cast with the upper half of the crank case. The lubrication is a combination of the splash and forced systems, and the cooling thermo-siphon, except where special conditions require the addition of a pump.

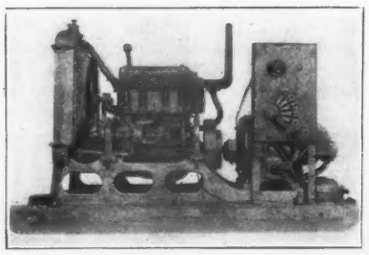
The generator is self exciting and self regulating, giving practically constant energy throughout the working range. It gives a no-load or striking voltage of 60, which automatically de-



Arc-Welding Machine Driven by 2-Cylinder Kerosene Engine.

creases to the proper welding voltage (usually 18 to 20 volts) when the arc is struck. It is driven at a speed of 1200 r.p.m. and has a normal output of 4 kw. and delivers a maximum working current of 200 amperes. The panel carries the generator field rheostat and series-field dial switch by which the current can be adjusted from 200 to 75 amperes in 25-ampere steps. A reactor choke coil mounted on the set and connected in the welding circuit protects the generator from current surges.

The heavy-duty equipment can be arranged to supply either one or two welding circuits. It consists ordinarily of a 20-hp., 2-cylinder opposed Reliable engine and a type WD-9 generator and welding panel, the whole



Arc-Welding Machine Driven by 4-Cylinder Gasoline Engine.

being mounted on a welded structural-steel base with a net weight of 2400 lbs. for the single-operator equipment and 3200 lbs. for the double-operator equipment. The engine is designed for continuous operation at rated output. Careful balancing practically eliminates all vibration and the horizontal cylinder and relatively small fly-wheel make possible a compact assembly with the rest of the outfit. It will run on kerosene, distillate, gasoline, or natural or artificial gas with a fuel consumption per b. hp. not exceeding 1 pint of kerosene, distillate or gasoline, 10 to 12 cans of natural gas, or 17 to 22 ft. of average illuminating coal gas.

The generator is driven by a silent chain running in oil, and except for the speed its characteristics are similar to the WD-10 machine which forms part of the medium-duty outfits. They run at 1750 r.p.m. instead of 1200 r.p.m., and differ somewhat in the windings because of the difference in speed and service requirements. An ammeter is mounted on the panel of each heavy-duty equipment, but in other respects they are identical with those of the medium-duty sets. A mere change of location constitutes the only difference between the reactors of the two sets.

Steam Jet Conveyor in Columbia Plant.

The plant of the Columbia Graphaphone Co., Bridgeport, Conn., consists of three Edgemore boilers of 500 hp. each. One of these boilers is hand-fired, the others being equipped with Taylor stokers. About 7 tons of ashes accumulate each 24 hrs.

During the war the plant executives saw the necessity for cutting overheads at every possible source. They realized that ash handling was unproductive, unprofitable and therefore wasteful. After considerable investigation of the various types of equipment on the market they decided that the steam jet conveyor of the American type made by the Conveyors Corporation of America, was the best for their purpose. Accordingly, a conveyor was designed for the plant installed.

The conveyor consists of a suction line 61 ft. in length, terminating in a riser of 40 ft., followed by a horizontal run of pipe of approximately 25 ft. The ashes are discharged into a steel ash storage tank, situated just outside of the boiler house. From time to time the ashes are withdrawn from the tank and hauled away in trucks or wagons.

American Steam Jet Conveyor in Columbia Graphaphone Co.'s Works.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Campbell Lamp & Specialty Co., 405 Broadway, New York City, has filed notice of dissolution under state laws.

Electric Lamp & Products Co., 512 Paterson road, Jersey City, N. J., has changed its name to the Lhytan Electric Lamp Co.

Electrical Contractors Corp., Waterbury, Conn., has filed notice of increase in its capital stock from $50,000 to $100,000.

Frosch Manufacturing Co., 61 Fulton street, New York City, manufacturer of flashlight and other electrical apparatus, recently sustained a loss by fire.

Maytag Co., Newton, Ia., has announced another reduction in the price of its washing machines, the latest cut making a total reduction of 35% from the 1920 scale.

Ideal Electric & Manufacturing Co., Mansfield, O., has issued a bulletin on the subject of elevator motors. It is stated that elevator manufacturers and others interested in this field will find this bulletin of value.

Joseph Netzer Hardware Co., Laredo, Tex., has announced that its salesmen in Mexico report a brisk demand for electric lighting fixtures, including chandeliers, wall lamps, boudoir lamps, table and floor lamps, etc.

Ward Electric Co., Morristown, N. J., recently incorporated with a capital of $25,000, will operate a plant for the manufacture of electrical equipment at 813 Main street, Boonton, N. J. William E. Ward heads the company.

Appliances, Ltd., 208 King street, West, Toronto, Can., has announced that F. E. Hazard and I. A. Schulherr have resigned from the service of the company and that J. D. Cameron, formerly vice-president, has been elected president and general manager.

Multi Electrical Manufacturing Co., 703 Fulton street, Chicago, has announced that A. C. Walton is now located at 500 Fifth avenue, New York City, where a complete line of "Multi" porcelain bushings, "Powerlet" fittings and "Multi" cartridge fuse cutouts is displayed.

Delta-Star Electric Co., 2433 Fulton street, Chicago, has issued bulletin No. 36, which illustrates and describes its high-tension outdoor unit type, improved form PM-36 pole-top switches. The bulletin contains many diagrams, photographs and tabulations of various installations and equipments.

Radio Corp., of America, Woolworth building, New York City, is completing the installation of a new wireless station at Maracaibo, Venezuela, to be one of a series of such plants to be erected in that country. The station is equipped with a 5-kw. radio set, with sending radius of about 800 mi. by day and 1600 by night. Seven additional stations will be constructed at an early date by the Venezuelan Government, to be followed later by the erection of 16 other plants, to provide service for the capitol of every state in the country.

Delta Equipment Co., 148 North Third street, Philadelphia, has been purchased from Andrew I. Mehan by P. J. McBride and G. B. McClennen. They have enlarged the plant and recently purchased the 4-story building the company occupies. They are gradually extending their business in used and rebuilt equipment and electric motors.

Robert Findlay Manufacturing Co., Inc., 224 Fifth avenue, New York City, has issued special catalog No. 20, which illustrates and describes its line of lighting fixtures. The company has also compiled an index and net price list of its special catalog, the object of which is to cater particularly to those dealers who make a specialty of handling lighting fixtures.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has announced that the manufacture of arc lamps, arc lamp repair parts and copper "Luxsolite" fixtures has been transferred from the Newark works to South Bend, Ind. Arrangements have been made so that service will be insured during the transfer of equipment to the South Bend works.

Macbeth-Evans Glass Co., Pittsburgh, manufacturer of "Monax" glass, has announced that the Archer model, a lighting unit using "Monax" glass, designed by George Ainsworth, has been selected for the equipment of the new Liggett building, 42d street and Madison avenue, New York City, after exhaustive tests of 21 units by the engineers for the architects, Carrere & Hastings and R. H. Shreve.

Bauman & Loeb, Inc., 138 Bowery, New York City, and 153 North Michigan avenue, Chicago, designer and manufacturer of lighting fixtures, has just issued catalog No. 6, containing 48 pages of illustrations and descriptions of its complete line of lighting fixtures. The "2400 line," only a few items of which were displayed in February at the Buffalo Fixture Market, is featured and presented in full in this catalog.

P. A. Geier Co., Cleveland, manuturer of the "Royal" electric cleaner, publishes in the August issue of its house-organ an article by F. J. Gottron, which contains an analysis of price conditions, whereby it is shown that the cost of appliance selling has increased more than the cost of appliance manufacturing has been reduced. Mr. Gottron suggests that as far as the public is concerned the small amount that might be saved by customers waiting for any reasonable price reduction is more than balanced by the time and labor lost through continuing wasteful methods of housekeeping. Another article of interest tells how an electric cleaner is used by the T. H. Symington Co., Rochester, N. Y., in its foundry to clean fine sand from the cement floor in the core room.

C. G. Everson & Co., 70 West Lake street, Chicago, has issued a booklet entitled "Fashions in Fixtures," which contains suggestions for lighting fixtures for the home. The company has also distributed a pamphlet, the aim of which is to place its wares and service before the modern homebuilder and give suggestions with a view of offering a practical solution for home lighting problems as found in many homes.

Benjamin Electric Manufacturing Co., Chicago, has issued a circular covering the "Kelly-Kontainer," a modern sanitary food receptacle—watertight and odor-proof, the contents being kept hermetically sealed by close-fitting cover with rubber gasket, held down securely by positive pressure aluminum clamp. The company states that this container is made in 0.5 pint, 1 pint, quart and 1.5-quart sizes, of heavy selected steel carefully drawn to shape and upon which Benjamin porcelain enamel has been fused under 1800 deg. F. It is lustrous white and will not stain or discolor.

Belden Manufacturing Co., Western avenue and 23d street, Chicago, has announced that it is prepared to supply standard magnet wire in even quantities of 0 25, 0.5 and 1 lb. on small but substantial fiber spools, the charge for which is so small that it can be included in the retail price of the wire. For amateur and over-the-counter trade it is stated that this package is quite convenient, doing away with bothersome spool charges, returns, rewindings and broken packages. It opens up new possibilities for profitable business in a line which has hitherto been a retail nuisance, the announcement states.

Cochrane Steam Specialty Co. of Massachusetts has been organized to represent in New England a number of well-known manufacturers of power plant equipment, including the H. S. B. W. Cochrane Corp., manufacturer of feed water heaters, steam and oil separators, V-notch meters and metering heaters, hot and cold process water softeners, flow meters, precision valves and multiport drainers, also the Steam Motors Co., Inc., manufacturer of steam turbines for driving generators, pumps, fans, etc., and the D. Connelly Boiler Co., builder of water tube steam boilers. The office, which is in charge of Elliott Greene, who has long been connected with the several lines mentioned, is located at 1045 Oliver building, Boston.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

F. A. DARST has resigned as manager of the Williamson Power Co., at Clay Center, Kan., to take a similar position with the Public Service Co. of Oklahoma, at Vinita.

WILLIAM L. URQUHART, export manager for the Hart & Hegeman Manufacturing Co., Hartford, Conn., has been appointed British vice-consul for the port of Hartford.

WALTER G. BUNZL, formerly chief engineer of the Richmond Radiator Co., New York City, is now associated with the Pittsburgh Electric Furnace Co., Pittsburgh, at its New York offices, 149 Broadway.

H. BOYD BRYDON, of the Byllesby Engineering & Management Corp., Chicago, for the third time has been appointed a member of the Prime Movers Committee of the National Electric Light Association.

JOHN C. KOONS, formerly first assistant postmaster-general, has been appointed executive assistant to the president of the Chesapeake & Potomac Telephone Co., with headquarters at Washington, D. C.

W. A. HADLER, of the W. A. Hadler Manufacturing Co., Buffalo, N. Y., president of the Lighting Fixture Dealers' Society of America, and president of the Buffalo Lighting Fixture Dealers' Association, has been elected president of the North Jefferson Avenue Business Men's Association.

SAMUEL ROTHFARB is at present sales manager of the Kramerlite Co., 577 Broadway, New York City, manufacturer of lighting fixtures, lamps and domes and formerly conducted under the name of the Kramer Bros. Lamp Co. and under his management the yearly sales have been trebled. Six years ago Mr. Rothfarb was a buyer in the lamp and dome department of the J. L. Kesner Co. He is also a student of economic conditions and firmly believes that a real business revival will take place in the near future.

Samuel Rothfarb.

S. W. KOHN, a recent graduate of the Case School of Applied Science as a Bachelor of Science in Electrical Engineering, has accepted a position with the National Power Machinery Co., Cleveland, as electrical engineer.

L. W. HELMREICH, who was formerly with the Arkansas Corporation Commission, Little Rock, Ark., has been appointed chief mechanical and electrical engineer for the Missouri Public Service Commission, Jefferson City, Mo.

C. B. COULSON has resigned from the operating department of the Cedars Rapids Manufacturing & Power Co., Montreal, Que., to accept a position in the supply sales department of the Canadian General Electric Co., Montreal.

M. R. STERN, operating engineer for Saratorius & Co., of Providence, R. I., the new owners of the Wheeling Public Service Co., and the West Virginia Utilities Co., in Morgantown, has been appointed general manager of these properties.

H. G. ANSCHUETZ, formerly assistant sales manager of the Manhatten Electrical Supply Co., New York City, is now sales manager of Paul M. Marko & Co., Inc., 1402-1412 Atlantic avenue, Brooklyn, N. Y., manufacturers of storage batteries.

WALTER S. FINLEY, JR., vice-president of the American Water Works & Electric Co., 50 Broad street, New York City, has recently been elected chairman of the Metropolitan Section of the American Society of Mechanical Engineers, which embraces a membership of over 3000.

FLOYD E. WEEKS, for the past 4 years Pittsburgh district manager of the Shepard Electric Crane & Hoist Co., has been transferred from the sales to the service department of the company, with headquarters at Montour Falls, N. Y., where he will have charge of service, erection and repairs.

O. K. DAVIS, secretary of the National Foreign Trade Council, 1 Hanover Square, New York City, has been appointed chairman of the Advisory Committee on Foreign Mails and will be the chief representative of the U. S. Government at the Pan-American Postal Congress, which meets in Buenos Aires, Argentina, this month. The Advisory Committee on Foreign Mails is an organization of American business men interested in the development of postal service in all parts of the world. During the last few days this committee has been working in close co-operation with the Post Office Department and has been able to initiate and secure many extensions and improvements in our foreign mails.

HARVEY KEYS, supervisor of the Electric Shops of the Commonwealth Edison Co., Chicago, has resigned to accept a position as vice-president and general manager of the Equitable Sales Co., Pittsburgh. He had been connected with the Commonwealth Edison Co. for 11 years, being employed in the contract department first, later managing the Broadway Electric Shop when it was first opened, and 3 years ago entering the main shop as supervisor. Mr. Keys is well known in the electrical industry and his many friends will be pleased to learn of his new connection.

Harvey Keys.

H. S. WYNKOOP, electrical engineer of the Department of Water Supply, Gas and Electricity, Municipal building, New York City, has been chosen by President A. W. Berresford of the American Institute of Electrical Engineers to represent the Institute in co-operating with the Building Codes Committee of the Department of Commerce.

DR. ROBERT A. MILLIKAN, professor of physics at the University of Chicago, who has gained world-wide distinction for his original researches on the electron and the structure of matter, has been appointed director of the Norman Bridge laboratory of physics at the California Institute of Technology, Pasadena, Cal., and chairman of the executive council of the Institute.

WILLIAM A. DEL MAR, chief engineer of the Habirshaw Electric Cable Co., Yonkers, N. Y., is the author of an article on "The Elementary Principles of Electricity," which appeared in a recent issue of *The Wire Message* published by the Habirshaw Electric Cable Co. The article mentioned was prepared by Mr. Del Mar as part of an educational course established for the benefit of the organization.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Greenville, Me.—Motors, controlling devices and other electrical equipment will be installed in the new 2-story machine and repair shop, to be erected by the Great Northern Paper Co., Exchange building, Bangor, Me., at its Greenville mills. Crowell & Lancaster, Exchange building, Bangor, are architects and engineers.

West Pownal, Me.—The Board of Directors of the State School for Feeble Minded has taken bids for the construction of a 1-story power house at the institution, 45 by 75 ft., brick and concrete, estimated to cost $75,000. R. D. Kimball Co., 6 Beacon street, Boston, are engineers.

Winter Harbor, Me.—The Winter Harbor Light & Power Co. has been incorporated with a nominal capital of $5000, to operate a local electric light and power system. S. P. Wetherill is president, and Samuel J. Henderson, treasurer.

Manchester, N. H.—The Amoskeag Manfacturing Co. will soon commence the construction of its proposed hydroelectric generating plant at the Amoskeag dam, to be used in connection with its local cotton and woolen mills. The plant will have an initial capacity of about 30,000 hp., with installation comprising three 10,000-hp. units. The work on the dam is well under way and it is proposed to complete the structure at an early date. The company has inaugurated preliminary surveys of property at Moore's Falls, near Merrimack, and a new power plant will be constructed in this vicinity at a later date.

Lynn, Mass.—Electrical equipment, refrigerating apparatus and other mechanical equipment will be installed in the new cold storage plant to be constructed by Sprague, Breed, Stevens & Newhall, Broad street near Market street. It is estimated to cost $30,000. John H. Proctor & Co., Boston, are architects.

New Haven, Conn.—The United Illuminating Co., 84 Temple street, has awarded a contract to the Standard Construction Co., 153 Court street, for the erection of a 2-story, brick and reinforced-concrete addition to its electric power plant, about 60 by 65 ft., to be located on Grand avenue. The company will also build a reinforced concrete cold storage plant at the same address.

Providence, R. I.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., has awarded a contract to M. Soretto, 3 Tremont row, Boston, for extensions and improvements in its local power and boiler plant, estimated to cost $50,000.

Albany, N. Y.—Considerable electrical and mechanical equipment will be installed in the proposed 2-story plant addition to be erected by the Thatcher Propeller & Machine Co., Larned street, estimated to cost $150,000, with machinery.

Brooklyn, N. Y.—The Brooklyn Edison Co., Inc., 360 Pearl street, has arranged for a bond issue of $3,000,000, the proceeds to be used for extensions, improvements, general operations, etc. M. S. Sloan is president.

Buffalo, N. Y.—The proposed plans for the construction of a municipal electric light and power plant, now being considered by the City Council, will be placed to a referendum vote of citizens, in accordance with present tentative arrangements. City Commissioner Graves has the project in charge and will secure details and estimates of cost.

Canadaigua, N. Y.—The election to bond the city for $120,000 for a sewage disposal plant and to enter into a contract with the Rochester Gas & Electric Corp. to install a modern curb lighting system in the business section was carried. Address the mayor.

Georgetown, N. Y.—The Georgetown Electric Lighting Co. is planning the construction of an electric power plant, with local distributing system. Application for permission has been made to the Public Service Commission.

Governeur, N. Y.—The village board has under consideration the purchase of the Duzee water power site for developing electric light and power. Address village clerk.

Iona Island, N. Y.—The Bureau of Yards and Docks, Navy Department, Washington, D. C, will soon commence the construction of a power plant at its local property, to cost close to $30,000.

Long Island City, N. Y.—Considerable electrical and mechanical equipment will be installed in the new woodenware manufacturing plant of Charles J. Teepe, Inc., 15 Wilbur avenue, at Nott and Vernon avenues. In addition to motors, controlling devices and other electrical apparatus, new elevators will be installed. L. J. Viebmann is head of the company.

New York, N. Y.—The Harlem Board of Trade, 125th street, is developing plans for the installation of an electrically operated signaling system for traffic regulation along 125th street, to comprise towers, etc.

New York, N. Y.—Electrical and mechanical equipment will be installed in the laundry plant to be erected at 434-36 West 41st street by the Pioneer Wet Wash Laundry Co., 514 West 46th street, estimated to cost $40,000.

New York, N. Y.—Considerable electrical and mechanical equipment will be installed in the new 4-story tobacco factory to be constructed at Avenue A. near 71st street, by P. Lorillard & Co., 119 West 40th street, estimated to cost $400,000. The construction contract has been awarded to the Turner Construction Co., 244 Madison avenue.

Salamanca, N. Y.—Considerable electrical equipment will be installed in the 4-story plant addition to be erected by the Salamanca Furniture Co., to be 50 by 145 ft., and estimated to cost $100,000.

Solsville, N. Y.—The Madison County Power Co., Inc., has filed application with the Public Service Commission, for permission to construct and operate a local electric light and power plant, with distributing system.

Gloucester City, N. J.—The City Council has completed plans for the construction of its proposed electrically operated pumping plant for the municipal water works. Bids have been asked. Remington & Vosbury, Camden, N. J., are engineers.

Jersey City, N. J.—Swift & Co., 154 Ninth street, will make extensions and improvements in the power house at their local meat-packing plant to cost about $25,000.

Oxford, N. J.—Fire, July 29, destroyed the power house of the Empire Steel & Iron Co., Washington avenue, comprising engine and boiler departments. It is understood that the structure will be rebuilt at an early date.

Trenton, N. J.—The Woodlawn Park Association will install an electric lighting system comprising about 1000 lamps in connection with a number of amusement devices to be constructed at Woodlawn park.

Trenton, N. J.—The City Commission has approved plans for extensions and improvements in the municipal street lighting system in certain parts of the city, following out similar work placed under way in recent months, in accordance with recommendations made by Prof. C. E. Clewell, University of Pennsylvania, lighting expert for the city. The proposed work will include a new street lighting system in the Sixth and Eleventh Ward districts, aggregating about 20 mi. of illumination. The Commission also has preliminary plans under way for improvements in the street lighting system in the business district, estimated to cost $30,000.

Laurel, Del.—Electrical and mechanical equipment will be installed in the ice-manufacturing plant to be constructed by the Laurel Ice Co.

Wilmington, Del.—Considerable electrical equipment will be installed in the new sugar refinery to be erected by the Wilmington Sugar Co., at a cost estimated at $3,000,000. W. J. Wayte, Inc., Grand Central Terminal, New York City, is architect and engineer.

Altoona, Pa.—Electrical equipment,

refrigerating apparatus and other machinery will be installed in the ice-manufacturing plant to be erected by the Germania Brewery, 1808 Ninth avenue, to cost about $75,000. Plans are being prepared.

Charleroi, Pa.—The Light Committee of the local chamber of commerce, W. M. Milliken, chairman, is perfecting plans for the installation of a new "white way" street lighting system in the business district. A number of other municipalities in this district are arranging plans for similar improvements, awaiting the outcome of the new Charleroi installation.

East Nottingham, Pa.—The Public Service Commission has granted permission to the Oxford (Pa.) Electric Co., operating in Chester county, to acquire the property of the East and West Nottingham Electric companies. The new owner will improve and merge the systems.

Hanover, Pa.—The General Gas & Electric Co, has been chartered under state laws with a capital of $5500, to operate a local electric light and power system. W. F. Kintzing is treasurer.

Hazelton, Pa.—The New Boston Coal Co. has closed an agreement with the Pennsylvania Power & Light Co. for the electrification of its properties and furnishing service.

Philadelphia, Pa.—The Philadelphia General Hospital has filed plans for the erection of a power house at 34th and Vintage street to cost about $20,000.

Reading, Pa.—Considerable electrical equipment will be installed in the proposed 2-story factory addition to be erected by the Iris Hosiery Co., 902 Mulberry street, estimated to cost $40,000.

Riddlesburg, Pa.—The Coaldale Power Co. has been incorporated with a nominal capital of $5000 to operate a local electric light and power plant and system. John M. McIntyre is treasurer.

Scranton, Pa.—The Delaware, Lackawanna & Western Railroad Co. has taken bids for the construction of a power house and substation for switching work in this district.

Towanda, Pa.—A group of electric utilities has been organized in this section, each with nominal capital of $5000, to install and operate electric plants and systems. The companies will be known as the Monroeton Electric Co., Powell Electric Co.; Wysox Electric Co., North Towanda Electric Co. and South Towanda Electric Co. O. L. Haverly, Athens, Pa., is treasurer.

Uniontown, Pa.—The Board of Directors of the Union Hospital has awarded a contract to Clingen Brothers for the construction of a 1-story power house at the institution.

Baltimore, Md.—The United Railways & Electric Co., Continental building, is considering the installation of a trackless trolley system, to operate with overhead feed lines in the suburban districts.

Charleston, W. Va.—The Acme Electric Co. has been incorporated with a capital of $25,000, to operate an electric light and power system in this vicinity. John B. Ray and W. D. Payne, Charleston, head the company.

Ferguson, W. Va.—The Huntington Coal Mining Co., 601½ Ninth street, Huntington, W. Va., recently organized with a capital of $600,000, is planning the installation of considerable electrical equipment at its properties at Ferguson, comprising motors, controlling devices, switchboard, etc. Bids for equipment will be taken about Sept. 1. Paul A. Boothe & Co., Huntington, are engineers. C. N. Morrison is president.

Morgantown, W. Va.—Motors and other electrical equipment will be installed in the machine shop and foundry to be erected by the Romisch Manufacturing Co., to replace its plant recently destroyed by fire. It will be 2-story, 50 by 50 ft., and is estimated to cost $25,000.

Williamson, W. Va.—Mark H. Russell and M. T. Perseger are organizing a company with a capital of $1,000,000, to construct and operate a local cold storage and ice-manufacturing plant. Plans are under way. Considerable electrical equipment will be installed.

King, N. C.—Considerable electrical equipment will be installed in the feed milling plant to be constructed by the King Milling Co. W. G. Johnson is president and manager.

Donalds, S. C.—The Town Council has arranged for a bond issue of $12,000 for the installation of an electric lighting plant. B. H. Carleton is commissioner of public works.

Lamar, S. C.—The Lamar Power & Light Co. has been incorporated with a capital of $31,200 to operate a local electric light and power system. E. H. Segars is president, and R. P. Berry, treasurer.

Columbus, Ga.—The City Council has awarded a contract to the Georgia Electric & Construction Co. for the installation of a street lighting system on Triangle street.

Moore Haven, Fla.—The Town Council has awarded a contract to Fairbanks, Morse & Co., 115 East Lombard street, Baltimore, Md., for equipment for its proposed municipal electric power plant. Thomas E. Frederick is engineer.

St. Cloud, Fla.—The St. Cloud Telephone Co, recently organized to take over a local telephone system, is planning extensions and improvements in the plant and lines. T. C. Watson is president and manager.

Webster, Fla.—The City Council has disposed of a bond issue for the installation of a municipal electric power plant, and will call for bids for equipment at an early date.

NORTH CENTRAL STATES.

Muskegon, Mich.—The new foundry building of Campbell Wyant and Cannon, located at McKinney avenue and Henry street, will be completed January 1. This is the first of eight units to be ultimately constructed. The production of automobile cylinder castings calls for special equipment and machinery of all kinds, and more than 130 electric motors will be installed, ranging in sizes from 25 to 125 hp. About 2000 hp. connected load will be required for power and lighting.

Blockington, Ind.—Bids for wiring Kirkwood hall, Indiana University, were called for Aug. 10. Address John W. Cravens, secretary of Board of Trustees.

Grabill, Ind.—The Farmers & Merchants' Telephone Co. has been incorporated with a capital of $20,000 to operate telephone lines and exchanges. The directors are Franklin Klopfenstein, Lawrence Klopfenstein and Albert Egly.

Logansport, Ind.—Bids were received Aug. 10 for the furnishing of lamps, lamp posts, conduits, wires and all other materials necessary thereto for the construction, erection and installation of a system of street lamps and posts, in accordance with plans and specifications on file with Roscoe Creery, city clerk.

Wabash, Ind.—The Lincolnville Telephone Co. is being organized by farmers in the vicinity of Lincolnville, near Wabash, for the construction and operation of a telephone system in this section.

Park Ridge, Ill.—Bids were received Aug. 9 by the City Council for automatic controllers for two 20-hp motors and one 75-hp. motor, alternating current. Plans and specifications are on file at the office of the city clerk and at the office of H. L. Emerson, 1118 Chamber of Commerce building, Chicago. Address Harold W. Ward, city clerk.

Urbana, Ill.—An ornamental lighting system for northwest Urbana has been ordered by the Board of Local Improvements. The improvement will cost $52,032.60 and will be of the same general type used in other parts of the city.

Bear Creek, Wis.—The Bear Creek Electric Light Co. has been formed with the purpose of providing an electric light system for the village. Address the mayor.

Minneapolis, Minn.—The Northern States Power Co. has applied to the Federal Power Commission for a preliminary permit to develop power at the U. S. Lock and Dam No. 1, at St. Paul, in the Mississippi river. It is stated that this application conflicts with that of the City of St. Paul. It is to be used for public utility purposes.

Alley, Mo.—Conrad Hugg of Kansas City is considering building a dam across Mammoth Spring, making a lake of about 17 acres and furnishing the necessary power for lighting the grounds and buildings of a summer resort and outing place at Alley, Mo. Mr. Hugg is president of the Crystal Springs Townsite Co., which owns Mammoth Springs.

Chillicothe, Mo.—The council has been petitioned for additional street lamps. Address clerk of Board of Public Works.

Columbia, Mo.—The University of Missouri has plans under way for the construction of a 1-story and basement power plant at the institution, 50 by 200 ft., to cost about $150,000. Professor Guy D. Newton is engineer.

Kansas City, Mo.—The Kansas City Light & Power Co. is planning the early installation of equipment at its power plant now in course of construction on the Missouri river waterfront, to 36 by 132 ft. A. E. Bettis is chief engineer.

Lutesville, Mo.—C. Alexander and

associates are planning the construction of a local electric power plant to cost about $75,000.

St. Louis, Mo.—The Excelsior Laundry Co., Grand and Bell streets, is taking bids for the construction of a power plant, 100 by 140 ft., and mechanical laundry works, 80 by 135 ft., at Grand street and Washington avenue, to cost about $200,000.

Stoutsville, Mo.—The question of electric current for Stoutsville is up again. Monroe City has made a good proposition to some of the city officers. Address the mayor.

Osborne, Kan.—The City Council has commenced excavations for its proposed municipal electric power plant, to be 1-story, 47 by 75 ft., estimated to cost $70,000. E. T. Archer & Co., New England building, Kansas City, Mo., are engineers.

Redfield, S. D.—The Spink County Power Co. is considering the building of a transmission line from a generating plant at Aberdeen to connect with the present lines of the company at Mellette. Towns on the present line will be asked to vote bonds to make up the sum with which the line will be built.

Watertown, S. D.—J. G. Robertson, 2542 University avenue, St. Paul, Minn., was awarded the contract for installing an additional unit in the municipal light plant, one 610 kv-a. generator and Northburg engine. Address Brownie Mather, city clerk.

SOUTH CENTRAL STATES.

Lexington, Ky.—The Commercial Coal Mining Co., recently organized, is planning the installation of electrical equipment at its local mining properties.

Johnson City, Tenn.—Considerable electrical and mechanical equipment will be installed in the proposed new cold storage plant to be constructed by the Southern Refrigeration Co., recently formed with a capital of $400,000. Preliminary plans for the plant are under way.

Knoxville, Tenn.—The Sunshine Land & Power Co. has been incorporated with a capital of $20,000 to operate an electric light and power system in the vicinity of Knoxville. J. E. Dupes and M. L. Wolf head the company.

Burnwell Mines, Ala.—The Burnwell Coal Mining Co. is planning the installation of electrically operated haulage equipment and other electrical apparatus at its coal properties.

Mountain Home, Ark.—Dillen Underhill and associates are organizing a company to operate a local electric light and power plant. It is proposed to construct an ice-manufacturing plant to be operated in connection with the power unit.

Bartles, Okla.—The Southwestern Bell Telephone Co. will expend $200,000 for improvements, consisting of switchboards and observing boards.

Buffalo, Okla.—The Buffalo Light & Power Co. has been incorporated with a capital of $20,000 to operate a local light and power system. E. H. George and S. R. Woodward head the company.

Hallettsville, Tex.—Bonds have been voted for purchasing a new engine for the light and water plant. Address the mayor.

Poteet, Tex.—C. C. Shotts and O. G. Barrow have organized a company to install a lighting system. Power to the amount of 1250 kw. will be used.

Sanderson, Tex.—The Sanderson Ice, Water & Light Co. has been incorporated with a capital of $50,000 to operate a local electric light and power system. The company is headed by John Kerr and W. H. Mansfield.

WESTERN STATES.

Salmon, Ida.—The Haynes-Stellite Co., 30 East 42d street, New York City, has applied to the Federal Power Commission for a license to construct a diversion dam, conduit, power house, and transmission line on Big Creek, in Lemhi county, Ida., 25 mi. from Sa'mon, Ida., to be used for mining purposes.

Monticello (San Juan county), Utah.—The Blue Mountain Irrigation Co. has applied to the Federal Power Commission for a license to construct a small diversion dam in Pole canyon, a 5 mi. pipeline to the power house, and a 3.5 mi. transmission line to Monticello to be used for public utility purposes.

Chehalis, Wash.—Plans are being prepared for a building to be erected for the city light department. Bids will be asked at once.

Portland, Ore.—The Portland Railway Light & Power Co. has applied to the Federal Power Commission for a preliminary permit to construct a dam in the main fork of the Clackamas river, and tunnel 4 mi. to the company's Oak Grove creek conduit leading to its Oak Grove power house in Clackamas county, Oregon, to be used for public utility purposes.

Los Angeles, Cal.—The city has applied to the Federal Power Commission for a preliminary permit to construct a dam 550 ft. high at Boulder canyon in the Colorado river in Nevada and Arizona to be used for public utility purposes.

PROPOSALS.

East Orange, N. J.—The Board of Education, High School building, Winans street, will receive bids until Aug. 22, for electrical work, heating and ventilating equipment, etc., to be installed in the addition to be erected at the Ashland school, Park avenue. Frederick T. Dungan is secretary of the Board.

Meadville, Pa.—The Meadville School District will take bids until Aug. 22, for electric equipment, heating and ventilating apparatus, etc., to be installed in the local high school building, to be located at the public square. W. G. Eckles, New Castle, Pa., is architect, and R. X. Brown is secretary.

INCORPORATIONS.

Newark, N. J.—Alexander Morrison & Co., Inc. Capital, $100,000. To manufacture boilers and other power equipment. Incorporators: Morris A. Potter, L. M. Scheer and E. T. Adams, 111 Gotthart street.

Sayre, Pa.—Lane Signal Accessories Co. Capital, $500,000. To manufacture electrical and mechanical equipment. Incorporators: William H. Lane, Harry S. Fish and Raymond L. Gebhardt.

Wheeling, W. Va.—National Pump & Manufacturing Co. Capital, $750,000. To manufacture pumping equipment. Incorporators: John L. Kirkland and W. S. Romine.

Wilmington, Del. — Electrolier Manufacturing Co. Capital, $25,000. To manufacture electroliers and other electrical products. Incorporators: Harlan M. Stidham and William D. Cloud.

Poseyville, Ind.—American Generator Corp. Capital, $100,000. To manufacture lighting, heating and cooking equipment. Incorporators: O. E. Cauder, E. D. Fletchall and J. L. Schafer.

New York, N. Y.—Keystone, Appliance Corp. Capital, $2,500,000. To manufacture electrical appliances and equipment. Incorporators: James L. Watson, Thomas E. Halle and F. H. Butchorn.

New York, N. Y.—Rite Electric Lamp Co. Capital, $20,000. To manufacture electric lamps. Incorporators J. Shapera, I. Rendelman, and S. J. Berkowitz, 898 Broadway, Brooklyn.

Brooklyn, N. Y.—I. Sonnenberg Co. Capital, $20,000. To operate an electrical contracting business. Incorporators: R. and I. Sonnenberg, and S. Noble. The company is represented by G. H. Ittleman, 44 Court street.

Paterson, N. J.—C. & D. Lighting & Fixture Co. Capital, $10,000. To manufacture electrical equipment. Incorporators: Peter M. DeRuyter, M. L. and R. Harold Clement, 90 Washington street.

Montclair, N. J.—Bloomfield Storage Battery Co. has filed notice of organization to manufacture batteries and equipment. William H. Cleland, 37 Cloverhill place, heads the company.

Pittsburgh, Pa.—Terry Electric & Manufacturing Co. Capital, $100,000. To manufacture electrical equipment. Incorporators: Frank Jackson and Wilber A. McCoy.

Washington, D. C.—Thompson Manufacturing Co. Capital $350,000. To manufacture electric lighting and heating devices. Incorporators: James T. Thompson, H. N. Wayne and H. LeRoy Goff, Washington.

FOREIGN TRADE.

[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]

Electrical Appliances (35,179)—A merchant in Italy desires to secure an agency for the sale of electrical appliances for industrial purposes. Quotations should be given c. i. f. Leghorn or Genoa. References.

Vacuum Cleaners (35,189)—A commission merchant from Japan who is in the United States desires to purchase vacuum cleaners. Reference.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Offering of Southern California Edison Co. Bonds.

The Harris Trust and Savings Bank, E. H. Rollins & Sons and the National City Co., Chicago, are offering $6,000,000 Southern California Edison Co. general and refunding mortgage 6% gold bonds, due Feb. 1, 1944, at 88 and interest, yielding 7.07%. The Southern California Edison Co. supplies electric light and power to over 150 cities and towns, including Los Angeles, serving an area of 55,000 sq. mi. and a population of over 1,500,000. The generating plants operated by the company have a total installed capacity of 384,700 hp., of which 249,500 is derived from water power. For the year ended June 30, 1921, gross earnings were $16,209,088; net earnings were $9,364,077, or more than two and one-half times the annual interest ($3,641,210) on outstanding mortgage bonds, including the present issue.

Will Receive Proposals for First Mortgage Bonds.

The United States Mortgage & Trust Co. has given notice that it will receive proposals until noon Aug. 15 for the sale of sufficient Montana Power Transmission Co. first mortgage bonds, dated Aug. 1, 1903, to exhaust the sum of $10,971 now in the sinking fund. The price must not exceed 105 and accrued interest, it was stated.

Earnings of Illinois Bell Telephone Co.

The Illinois Bell Telephone Co. reports revenues of $17,032,260 for the first 6 mo. of this year and expenses of $14,204,880, leaving net earnings of $2,827,380, or at the annual rate of 7.27% on the average property valuation of $77,777,327. Expenditures for additions and betterments amounted to $4,109,982, and the net gain in telephones in service was 15,098, bringing the total to 590,938.

Virginia Railway & Power Co.

	1921.	1920.
June gross	$ 835,578	$ 784,131
Net after taxes	243,155	231,317
Total income	255,858	245,793
Surplus after charges.	63,088	59,936
6 mo. gross	5,090,882	4,679,541
Net after taxes	1,561,741	1,495,468
Total income	1,628,760	1,569,930
Surplus after charges.	473,316	450,947

Great Western Power System.

	1921.	1920.
June gross	$ 580,479	$ 463,952
Net after taxes	382,369	235,875
Surplus after fixed charges	180,184	80,245
6 mo. gross	3,633,413	2,781,139
Net after taxes	2,337,519	1,487,727
Surplus after fixed charges	1,172,890	551,271

Midyear Statement of Standard Gas & Electric Co.

The net earnings of the Standard Gas & Electric Co. for the 12-mo. period ended June 30, 1921, were $3,153,312, an increase of $76,700 over the calendar year of 1920. A comparison of the gross earnings, operating expenses and net earnings for the 12-mo. period ended June 30, 1921, and Dec. 31, 1920, follows:

12 mo. ended	June 30, 1921.	Dec. 31, 1920.
Gross earnings	$3,240,655	$3,122,450
General expenses and taxes	87,343	45,837
Net earnings	3,153,312	3,076,612

It is significant that 97.79% of Standard's gross income for the 12 mo. ended June 30, 1921, was derived from its investments in public utility bonds, notes and stocks and that only 2.21% of its income was derived from investments in oil securities, states the company.

A letter describing the excellent position of Standard Gas & Electric Co. is being mailed to all preferred and common stockholders. Two paragraphs from the letter are quoted. "The satisfactory results for the year 1920 have been continued during 1921, and further substantial increases in gross and net earnings of the utility subsidiary companies, as well as of the Standard Gas & Electric Co., are shown in the operating results. The strong financial position of the utility subsidiary companies has permitted them to take on large amounts of new business on a profitable basis, which should insure the continuance of the increases in their gross and net income throughout the year."

Adirondack Power & Light Corp.

	1921.	1920.
June gross	$ 351,185	$ 358,795
Net after taxes	34,034	86,160
Deficit after fixed charges	39,586	*33,933
12 mo. gross	4,797,882	4,218,987
Net after taxes	1,333,331	1,397,730
Surplus after fixed charges	455,550	786,458

*Surplus.

Note—12.5% of gas and electric revenues is included in operating expenses to cover current maintenance charges and credits to renewals and replacements.

Columbia Gas & Electric. Co.

For the 12 mo. ended June 30:

	1921.	Increase.
Gross earnings	$14,832,179	$1,317,419
Net earnings	7,230,454	531,186
Other income	2,688,562	236,495
Total net income	9,919,017	767,682
Lease, rent, etc	4,462,475	178,245
Fixed charges	697,966	*1,695
Surplus	4,758,575	591,132

*Decrease.

Duquesne Light Co. and Subsidiaries.

	1921.	1920.
June gross	$1,242,577	$1,154,557
Net after taxes	413,002	315,400
6 mo. gross	8,304,834	7,235,297
Net after taxes	2,940,149	2,291,566

Utah Power & Light Co. and Western Colorado Power Co.

	1921.	1920.
June gross	$ 519,609	$ 490,887
Net after taxes	232,524	193,858
Total income	242,769	206,142
Surplus after charges.	101,248	65,729
12 mo. gross	6,870,905	6,149,880
Net after taxes	3,242,475	2,886,885
Total income	3,386,567	3,017,506
Surplus after charges.	1,664,394	1,353,789
Balance after preferred dividends	1,057,776	762,289

Northern Ohio Electric Corp. and Subsidiaries.

	1921.	1920.
June gross	$ 694,551	$ 954,068
Net after taxes	208,556	194,752
Surplus after fixed charges	65,486	54,984
Balance after preferred dividends	35,486	24,984
6 mo. gross	4,411,830	5,659,210
Net after taxes	994,383	1,514,655
Surplus after fixed charges	95,735	722,519
Deficit after preferred dividends	84,264	*542,519

*Surplus.

Cities Service Co.

Earnings of the Cities Service Co. for June, 1921, and a comparison with June of last year are as follows:

	1921.	1920.
Gross	$823,785	$2,137,240
Net	783,187	2,075,714
Surplus after fixed charges	612,595	1,922,441

Gross earnings for the 12 mo. ended June 30, 1921, amounted to $19,922,312, while net earnings totaled $19,285,340 and surplus after fixed charges $17,293,925. After payment of preferred dividends there remained $12,493,208.

Louisville Gas & Electric Co.

12 mo. ended June 30	1921.	1920.
Gross earnings	$4,795,410	$4,023,993
Net earnings	2,178,408	1,977,157

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate. Per cent	Bid Aug. 3.	Bid Aug. 8.
Adirondack Electric Power of Glenns Falls, common	6	9½	9
Adirondack Electric Power of Glenns Falls, preferred	6	69	69½
American Gas & Electric of New York, common	..	102	103
American Gas & Electric of New York, preferred	6	36½	36½
American Light & Traction of New York, common	..	91	92
American Light & Traction of New York, preferred	6	77	78
American Power & Light of New York, common	4	53	55
American Power & Light of New York, preferred	6	62	62½
American Public Utilities of Grand Rapids, common	..	5	6
American Public Utilities of Grand Rapids, preferred	7	17	17
American Telephone & Telegraph of New York	..	106	105
American Water Works & Elec. of New York, common	..	3½	4
American Water Works & Elec. of New York, particip	7	8	8
American Water Works & Elec. of New York, 1st preferred	..	47	47½
Appalachian Power, common	..	4	4
Appalachian Power, preferred	7	28	29
Cities Service of New York, common	+extra	119	120
Cities Service of New York, preferred	6	45½	46
Commonwealth Edison of Chicago	8	109	109
Comm. Power, Railway & Light of Jackson, common	..	10	10
Comm. Power, Railway & Light of Jackson, preferred	6	30	30
Federal Light & Traction of New York, common	..	6	6½
Federal Light & Traction of New York, preferred	..	42	43
Northern States Power of Chicago, common	..	36	37
Northern States Power of Chicago, preferred	ex.div.7	79	80
Pacific Gas & Electric of San Francisco, common	..	54	55
Public Service of Northern Illinois, Chicago, common	7	78	77
Public Service of Northern Illinois, Chicago, preferred	6	80	79
Standard Gas & Electric of Chicago, common	..	8	8
Standard Gas & Electric of Chicago, preferred	8	31½	33½
Tennessee Railway, Light & Power of Chattanooga, common	..	¾	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	3½	3½
Western Power of San Francisco, common	..	26	26
Western Union Telegraph of New York	..	86	87
Industrials—			
General Electric of Schenectady	8	118	117
Westinghouse Electric & Mfg. of Pittsburgh, common	7	43½	44